GOULD ELECTRONICS, INC. / NL INDUSTRIES
CSM Site Summary

GOULD ELECTRONICS, INC. / NL INDUSTRIES

Oregon DEQ ECSI #: 49

5909 NW 61st Avenue
DEQ Project Mgr: Jill Kiernan
Latitude: 45.5686°
Longitude: -122.7457°
Township/Range/Section: 1N/1W/13

River Mile: 7.5 West bank

LWG Member ☐ Yes ☒ No

Upland Analytical Data Status: ☐ Electronic Data Available ☒ Hardcopies only

1. SUMMARY OF POTENTIAL CONTAMINANT TRANSPORT PATHWAYS TO THE RIVER

The current understanding of the transport mechanism of contaminants from the uplands portions of the Gould Electronics, Inc. (Gould) site to the river is summarized in this section and Table 1, and supported in following sections.

1.1. Overland Transport

The Gould property does not include frontage along the Willamette River. Runoff from the site is directed to East Doane Lake, a small, shallow lake located onsite. The lake at one time discharged to the Willamette River through a 48-inch drainpipe.

1.2. Riverbank Erosion

The Gould property does not include frontage along the river.

1.3. Groundwater

In 2000, the EPA issued a no-action ROD for groundwater for the site. DEQ is continuing the investigation of organic contamination in groundwater at the adjacent Rhone-Poulenc property, which may require cleanup of these contaminants on both Rhone-Poulenc and Gould properties under state authority (EPA 2002). The maximum concentration of lead detected recently in groundwater at the Gould site is 2.7 µg/L at a location approximately 0.25 mile from the Willamette River.

Utility lines located parallel to NW Front Street [see Supplemental Figure 1.3-2 from Dames & Moore (1987b)] are buried at approximately 20 feet bgs, which is below the water table in the fill unit. The utility line trench backfill may present a zone of higher permeability relative to the surrounding fill and thus be a preferential pathway for groundwater flow (Dames & Moore 1987b).

1.4. Direct Discharge (Overwater Activities and Stormwater/Wastewater Systems)

The Gould facility included no overwater activities along the Willamette River. During the facility's period of operation, surface water runoff on the property drained to East Doane Lake (EDL), which was also used for the disposal of battery acid, slag, and other wastes, including wastes from neighboring facilities. EDL discharged to the Willamette River through a 48-inch drainpipe beneath Front Avenue (Woodward-Clyde 1998).

Air contamination was a significant concern at the Gould facility, and airborne contaminants from the site (i.e., metals) deposited in the vicinity may have washed to the river through runoff from storm drain systems.

1.5. Relationship of Upland Sources to River Sediments

See Final CSM Update.

1.6. Sediment Transport

The Gould property does not include frontage along the river.

2. CSM SITE SUMMARY REVISIONS

Date of Last Revision: August 31, 2005

3. PROJECT STATUS

Source: DEQ 2004

Activity		Date(s)/Comments
PA/XPA	☒	1982, 1983
RI	☒	08/28/1985-03/31/1988
FS	☒	08/28/1985-03/31/1988
Interim Action/Source Control	☐	
ROD	☒	For Soils Operable Unit (3/88); ROD amendment modifying cleanup remedy (6/97); non-action ROD for Groundwater Operable Unit (9/00)
RD/RA	☒	07/18/1997-09/30/2000 / 06/01/1999-09/30/2000
NFA	☒	09/30/2000; final Closeout Report completed 8/02

DEQ Portland Harbor Site Ranking (Tier 1, 2, or 3): Tier 3

4. SITE OWNER HISTORY

Sources: Multnomah County Assessment & Taxation, Polk City of Portland directories, USACE aerial photos, DEQ 2004, Dames & Moore 1987b.

Owner/Occupant	Type of Operation	Years
Gould Electronics, Inc. **(owner/operator)**	Battery breaking, lead oxide production until 1981	1979 – present
Nikko Materials USA, Inc **(owner)**	Unknown	Unknown - present
NL Industries (a subsidiary of Morris Kirk and sons) **(owner/operator)**	Lead-acid battery recycling, lead smelting and refining, zinc alloying and casting, cable sweating, and lead oxide production (after 1965)	1971 – 1979
Morris P. Kirk & Sons, a subsidiary of NL Industries **(owner/operator)**		1949 – 1971
1 Safety and Supply Co. **(operator)**	Washing, separating, and reclaiming plastic fragments and lead oxide	1983 - unknown
Smelter Supply Company **(operator)**	Wholesale industrial supplies	1950 - unknown

5. PROPERTY DESCRIPTION

The Gould property is a 9.2-acre tract on the south side of NW Front Avenue, between NW St. Helens Road and NW Front Avenue, approximately 1.3 miles southeast of St. John's Bridge. The property is located in the heavily industrialized Doane Lake area of Portland (ECSI #36), approximately 1,000 feet from the west bank of the Willamette River at RM 7.5. The site has no riverbank frontage.

Properties adjacent to the Gould parcel include Esco Corporation to the northwest (ECSI #397), Rhone-Poulenc, Inc. (ECSI #155) to the west and south, a Portland Metro Central Recycling and Transfer Station to the southeast (formerly American Steel Industries; ECSI #1398), and a Schnitzer Investment Corporation property (ECSI #395) to the east (Dames & Moore 1987b; DEQ 2004). These properties were included with the Gould property in the Gould Superfund Site [see Supplemental Figure 1.3-2 from Dames & Moore (1987b)]. Northwest Front Avenue borders the Gould parcel to the north, with the Penwalt Corporation/Atofina (now Arkema) facility (ECSI #398) located across that street between the Gould property and the Willamette River. The eastern Doane Lake remnant (a.k.a EDL) formerly existed on the northern portion of the Gould parcel and extended onto the Schnitzer Investment Corporation and Metro transfer station properties (Dames & Moore 1987b).

The Gould site elevations range from approximately 25 to 47 feet above mean sea level (Dames & Moore 1987b). Most of the site is flat, originally sloping gently to the northeast (toward the former EDL), but was regraded following remedial activities to isolate the former lake from surface water runoff (EPA 1997).

6. CURRENT SITE USE

Operations on this site ceased in 1981. The site is currently fenced, and treated, stabilized soils and sediments are contained in an onsite containment facility (OCF) within the fenced area (EPA 2002).

7. SITE USE HISTORY

Unless stated otherwise, information in this section was obtained from the remedial investigation performed by Dames & Moore (1987b).

The area of the current Gould property was formed by gradual anthropogenic filling of the historical shallow oxbow Doane Lake. As a result of this filling, Doane Lake was gradually reduced to two remnants: EDL on and adjacent to the Gould, Schnitzer Investment Corporation, and American Steel Industries properties; and West Doane Lake (WDL), adjacent to the railroad tracks, Rhone-Poulenc, Inc., and Esco, Inc. properties [see Supplemental Figure 1.3-2 from Dames & Moore (1987b)].

A secondary lead smelting facility was completed on the property and began operation in 1949 under the ownership of Morris P. Kirk and Sons, a subsidiary of NL Industries, Inc. Facility operations included lead-acid battery recycling, lead smelting and refining, zinc alloying and casting, cable sweating (removal of lead sheathing from copper cable), and lead oxide production (after 1965). The smelter operated from 1949 to 1972. Prior to 1976, the facility had disposed of waste battery acid in EDL. In 1976, the facility began treatment of the waste acid and discharged it to the City of Portland sewer system.

After purchasing the property in January 1979, Gould stopped receiving lead-acid batteries in October, but continued to process the large existing battery stockpile. Lead refining operations were discontinued in January 1980, battery-breaking operations were discontinued on April 1, 1981, lead oxide production was halted in May 1981, and the facility closed entirely in August 1981. By the summer of 1982, most facilities, structures, and equipment had been removed from the property.

During the period of smelter operation, approximately 2,600 tons of shredded battery casings were placed offsite each year as fill in WDL (property owned by Rhone-Poulenc Inc.). The casing material consisted of polyester plastic, ebonite (hard rubber), lead oxide residues, and small amounts of lead and other metals. The fill also included scrap materials such as iron, wood, and rock. The RI (Dames & Moore 1987b) stated that total lead concentrations in the casing material ranged from 0.76 to 19%. Samples of the casings later tested failed the RCRA EP Toxicity leachate analysis for lead, but not for arsenic, chromium, and cadmium. A slag-like material resulting from the smelting operation, called "matte," was used as fill in the EDL. The matte consisted primarily of rock-like chunks of material composed of metallic sulfides (primarily iron), with 6 to 11% lead. The matte failed RCRA EP Toxicity leachate analysis for lead. After the smelter closed, the shredded battery casings were placed on the Gould site over the matte and into the EDL. Over the period of operation, approximately 87,000 tons of battery casings were disposed of onsite and on adjacent properties, approximately 12,000 tons of matte were produced and disposed of onsite, and approximately 6.6 million gallons of waste battery acid (sulfuric acid solutions) was discharged to former EDL (DEQ 2004). Stormwater from the majority of the site and parts of adjacent properties was also directed to EDL [see Supplemental Figure 4.3-1 from Dames & Moore (1987b)]. Former EDL discharged through a 48-inch drainpipe to the north beneath NW Front Street (EPA 1988; Woodward-Clyde 1998). The discharge entered the Willamette River approximately 200 feet east of the railroad bridge (EPA 1988).

Daily sweeping and cleaning residues containing zinc, copper, and minor amounts of magnesium from the zinc melting and alloys processes were gathered in 55-gallon steel drums, which were in turn deposited into EDL.

The Gould site was added to Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Information System (CERCLIS) in 1980, and was listed on the National Priorities List (NPL) on December 30, 1982 (DEQ 2004). A Consent Order between EPA, Gould, and NL Industries to perform an RI/FS at the site was signed in 1985. The RI/FS was conducted between 1985 and 1988. EPA issued a ROD for the soils operable unit (OU) at the site in March 1988. As of 1987, the RI field office building and cafeteria/welfare building were the only structures remaining onsite. In 2000, EPA issued a *No Further Action* status for groundwater beneath the Gould site because ongoing monitoring had shown that cleanup actions and exposure controls had significantly reduced threats to human health and the environment (EPA 2000). EPA delisted the Gould site from the NPL in September 2002.

8. CURRENT AND HISTORIC SOURCES AND COPCS

The understanding of the historic and current potential upland and overwater sources at the site is summarized in Table 1. The following sections provide a brief overview of the potential sources and COPCs at the site requiring additional discussion.

8.1. Uplands

Lead was the primary contaminant of concern at the Gould Superfund site (EPA 1988). However, zinc, copper and magnesium-containing wastes also were disposed of at and adjacent to the site. The waste sources at the site include the historical sources, as listed in the RI (Dames & Moore 1987b), and the current OCF:

Historical Smelter and Other Site Operations

The waste streams resulting from the smelter operations included battery (sulfuric) acid, shredded hard rubber and plastic battery casings, shredded plastic battery tops, and blast furnace matte. Until 1976 the battery acid was disposed of in EDL. The rubber and plastic from the battery casings and tops were used as fill material on the site, as was the blast furnace matte (Dames & Moore 1987b). The discarded lead-acid battery casings and matte were the primary lead source at the site (EPA 1988, 1997).

Other historical site operations included lead oxide production (which produced no identified waste), zinc alloying, and copper wire stripping. The zinc alloying process produced sweeping and cleaning residue wastes (discussed above), and the copper wire stripping produced waste plastic materials and recycled lead. The lead was presumably used in other site processes (Dames & Moore 1987b).

Historical Adjacent Industries

Wastes on the Gould Superfund site stemming from historical adjacent industries include herbicides and other organic compounds (phenols), as well as demolition debris from Rhone-Poulenc Inc., scrap steel and zirconium casting sand from Esco Corporation, metallic wastes from Pennwalt Corporation, lime and alkaline acetylene waste from Schnitzer/Liquid Air Corporation, and shredded automobile interiors from an unknown source on the Schnitzer/Liquid Air property (Dames & Moore 1987b).

Organic contaminants are also present on the Gould property (Environ 1995) (see Section 10.1.1). This organic contamination was not addressed during the Gould RI, but is being addressed by investigations of Rhone-Poulenc (Dames & Moore 1987b).

Historical Landfilling Operations

Fill materials used at the site included hydraulic dredge fill from the Willamette River, quarry rock, construction debris, foundry sand, steel mill slag, construction debris, and industrial waste materials from Gould and adjacent site operations such as the battery casing fragments, the blast furnace matte, shredded automobile interiors, and alkaline acetylene waste (Dames & Moore 1987b). Approximately 12,564 cubic yards of battery casings and components, 6.57 million gallons of acid, and 33,451 cubic yards of matte were disposed of on the Gould and/or Rhone-Poulenc properties (EPA 1988, 1997). In addition to metals, VOCs and bis(2-ethylhexyl)phthalate were detected in samples of landfilled material (AGC 1999).

Historical Secondary Sources

Analytical results of samples collected during the RI indicated that lead concentrations in certain areas of surface soil, subsurface soil, and EDL sediment were high enough that these media served as secondary lead sources [see Supplemental Figure 3.2-5 from Dames & Moore (1987b)]:

- **Historical contaminated surface soil**: Approximately 2,400 cubic yards of surface soil on the Gould property, and 970 cubic yards on the Rhone-Poulenc property served as a secondary lead source (EPA 1988).
- **Historical contaminated subsurface soil**: Approximately 6,133 cubic yards on the Gould property and approximately 5,927 cubic yards on the Rhone-Poulenc property served as a secondary lead source (EPA 1997). Other contaminants detected in EDL secondary source soil included herbicides, dioxins, furans, VOCs, phenols, organochlorine pesticides, and TPH (see Section 10.1.1 below; Environ 1995).
- **Historical contaminated remnant Doane Lake sediment**: Approximately 5,500 cubic yards of sediment acted as secondary source material in EDL (EPA 1988). Total lead concentrations ranged up to 12,000 mg/kg (EPA 1988). Other contaminants detected in EDL sediment included herbicides, dioxins, furans, VOCs, phenols, organochlorine pesticides, and TPH (Environ 1995).

Current OCF

A conceptual cross-section of the OCF at the Gould site is presented in Supplemental Figure 4, from Emcon (1995). Materials placed in the OCF included “sediments, created and untreated stockpiled materials, casings, soil and debris” (EPA 1997). Some of the waste was placed in the form of “stabilized blocks” (Emcon 1995). Detected contaminants in these materials included metals, herbicides, dioxins, furans, VOCs, phenols, and organochlorine pesticides (Environ 1995).

8.2. Overwater Activities

☐ Yes ☒ No

No overwater sources were identified at this facility, but East Doane Lake historically discharged to the Willamette through a 48-inch outfall located approximately 200 feet east of the railroad bridge (EPA 1998).

8.3. Spills

No known or documented spills at the Gould site were found on DEQ's Emergency Response Information System (ERIS) database for the period of 1995 to 2004, from oil and chemical spills recorded from 1982 to 2003 by the U.S. Coast Guard and the National Response Center's centralized federal database [see Appendix E of the Portland Harbor Work Plan (Integral et al. 2004)], from facility-specific technical reports, or from DEQ correspondence.

9. PHYSICAL SITE SETTING

The following documents were reviewed for information related to the physical setting, including geology/hydrogeology of the Gould site.

- Dames & Moore (1982)
  - Described the groundwater monitoring program at the site
- Dames & Moore (1986)
  - Developed remedial investigation work plan
- Dames & Moore (1987a)
  - Completed 2 soil borings, and 9 monitoring wells during a geologic and hydrogeologic investigation at the site. An additional 2 borings, 10 test pits, and 27 monitoring wells were completed on adjacent properties during the same investigation.
- Dames & Moore (1987b)
  - Completed a follow-up soil and groundwater investigation to characterize identified contamination at the site
- Environ (1995)
  - Gould Superfund Site Stage 1 Investigation
- Environ (1999)
  - Completed groundwater monitoring (including sampling) at the site
- Advanced GeoServices (2000)
  - Completed groundwater monitoring (including sampling) at the site
- Advanced GeoServices (2001)
  - Completed groundwater monitoring (including sampling) at the site
- EPA (2002)
  - Compiled a Final Close Out Report and proposed the removal of the Gould site from the NPL list

The Gould site is located on the western bank floodplain of the Willamette River between the Portland Hills and the Willamette River (Dames & Moore 1987b). The site is fairly level with the exception of an abrupt elevation change adjacent to East Doane Lake, located along the northwestern boundary of the site [see Supplemental Figure 1.3-2 from Dames & Moore (1987b)]. Ground surface elevations at the site range between 24.6 and 46.6 feet MSL.

The site is located on top of the area formerly occupied by Doane Lake. Fill material was placed in Doane Lake beginning in the 1930s until the 1980s, leaving two remnants of the former lake: East Doane Lake and West Doane Lane (Dames & Moore 1987b). A portion of East Doane Lake is located in the northwestern portion of the site [see Supplemental Figure 1.3-2 from Dames & Moore (1987b)].

9.1. Geology

The near-surface geology at the Gould site is dominated by the presence of artificial fill placed during the filling of Doane Lake. The fill material at the site varies from 10 to 25 feet in thickness [see Supplemental Figure 4.2-4 from Dames & Moore (1987b)] and consists of metal slag, scrap metal, demolition debris, silty hydraulic dredge spoils, rock quarry spoils, shredded automobile interiors, shredded battery casings, and carbide sludge (Dames & Moore 1987b).

Based on soil boring data, Quaternary alluvial deposits underlie the fill material and consist of relatively continuous lenses of sand and layers of clayey silt or clay (Dames & Moore 1987b). Basalt flows of the Columbia River Basalt Group (CRBG) underlie the alluvium at depths of 55 to 95 feet bgs. A geologic cross section through the site is shown on Supplemental Figure 3-6 from Geraghty & Miller (1991).

9.2. Hydrogeology

Monitoring wells at the site were completed in either the fill material or the alluvium. Two monitoring wells installed on adjacent properties (Esco, Inc. and Rhone-Poulenc, Inc.) were completed in the Columbia River Basalt [Wells W-6B and W-11B on Supplemental Figure 4.5-1 from Dames & Moore (1987b)].

Three primary water-bearing units have been delineated at the site: the fill material, the alluvium, and the CRBG. The fill unit is hydraulically connected to East Doane and West Doane Lake, as well as to the alluvial unit beneath it. However, groundwater in the fill does become perched in some areas due to layers of silts and/or clay within the alluvium (Dames & Moore 1987b). Groundwater flow within the fill is predominantly in a northerly direction (Dames & Moore 1987b).

The alluvial unit is hydraulically connected with the fill, East Doane and West Doane Lake, the Willamette River, and the CRBG. The alluvial unit can be divided into two water-bearing subunits because the lower alluvium is generally more silty and thus less permeable than the upper alluvium, which results in slightly differing groundwater levels between the two subunits (Dames & Moore 1987b). Groundwater flow within the alluvium is predominantly in a northerly direction (Dames & Moore 1987b).

10. NATURE AND EXTENT (*Current Understanding*)

The current understanding of the nature and extent of contamination for the uplands portions of the site is summarized in this section. When no data exist for a specific medium, a notation is made.

10.1. Soil

10.1.1. Upland Soil Investigations ☒ Yes ☐ No

Surface and subsurface samples collected during soil contaminant delineation at the Gould Superfund site for the RI were analyzed for metals, sulfate, and conventional parameters. The chemical analytical results are presented in Tables 4.5-1 through 4.5-3 of Dames & Moore (1987b) and are summarized below:

Analyte	Surface Fill (mg/kg)		Subsurface Fill (mg/kg)		Subsurface Alluvium (mg/kg)	
	Min	Max	Min	Max	Min	Max
Lead	14	20,000	16	67,000	10	85
Arsenic	2.6	63	0.3	87	3.3	6.0
Cadmium	0.5	12	0.50	13	0.50	1.6
Chromium	10	390	7	1,200	15	39
Hexavalent Chromium	0.5	0.5	0.5	1	0.5	1
Zinc	51	10,000	6	1000	47	78
Iron	12,000	39,000	140,000	6,600	18,000	34,000
Sulfate	14	9,700	12	6,100	13	160

During a Stage I investigation of the site, subsurface soil samples were collected from four soil borings on the Gould property (B-9 through B-12), as shown in Supplemental Figure 1 from Emcon (1995). The four borings were located in the general area of the soil considered in the ROD to be a secondary contaminant source [see Supplemental Figure 3.2-5 from Dames & Moore (1987b)], though lead concentrations appear much lower than the 3,000-ppm lead concentration criterion used to determine the secondary source area in the 1988 ROD (EPA 1988). Available preliminary results indicate that in addition to lead, the soil contained detected concentrations of VOCs, dioxins, furans, phenols, herbicides, and TPH [see Supplemental Table 4 from Environ (1995)]. The maximum detected concentrations are summarized below:

Analyte	Maximum Concentration
Ammonia	2.9 mg/kg
Arsenic	45.7 mg/kg
Cadmium	0.2 mg/kg
Chromium	27.3 mg/kg
Lead	100 mg/kg
Zinc	85.1 mg/kg
Pyritic Sulfur	0.5 %
Chlorobenzene	56 µg/kg
1,2-Dichlorobenzene	160 µg/kg
1,3-Dichlorobenzene	10 µg/kg
1,4-Dichlorobenzene	54 µg/kg
Chlorobenzene	23 µg/kg
Ethylbenzene	3.6 µg/kg
Pentachlorophenol	130 µg/kg
2,4-Dichlorophenol	130 µg/kg
2,4,5-Trichlorophenoxyacetic acid (2,4,5-T)	3,900 µg/kg
2,4,5-Trichlorophenoxypropionic acid (2,4,5-TP)	11 µg/kg
2,4-Dichlorophenoxyacetic acid (2,4-D)	2,000 µg/kg
Total Tetrachlorodibenzo-p-dioxins (TCDDs)	52 pg/g
Total Tetrachlorodibenzofurans (TCDFs)	220 pg/g
TPH-Diesel	12 mg/kg

10.1.2. Riverbank Samples ☐ Yes ☒ No

10.1.3. Summary

RI soil sample analytical results indicated that significant migration of contaminants from the fill layer into underlying alluvial deposits had not occurred (Dames & Moore 1987b). Herbicides (2,4,5-T, -TP, and 2,4-D) were detected in the four 1995 soil borings (Environ 1995).

10.2. Groundwater

10.2.1. Groundwater Investigations ☒ Yes ☐ No

A remedial investigation and feasibility study (RI/FS) was conducted at the site from 1985 to 1988 (DEQ 2004). The RI included the installation of approximately 32 monitoring wells to assess groundwater conditions at the site (Dames and Moore 1987b). Groundwater monitoring activities have continued through the soil remediation phase and the operation and maintenance phase of the project using three monitoring well clusters located downgradient from the OCF. Biannual sampling currently performed by Advanced GeoServices Corp. (AGC) takes place at two monitoring well clusters on the Gould property, one cluster on the ESCO property, and a single well on the Metro property (AGC 2001). The other monitoring wells were abandoned during implementation of the remediation phase (DEQ 2004).

10.2.2. NAPL (Historic & Current) ☐ Yes ☒ No

Available documents indicate that NAPL has not been observed at the site.

10.2.3. Dissolved Contaminant Plumes ☒ Yes ☐ No

Metals (lead, arsenic, cadmium, zinc, and antimony) and sulfuric acid were detected in groundwater samples collected at the site (DEQ 2004).

Plume Characterization Status ☒ Complete ☐ Incomplete

The EPA issued a no-action ROD for groundwater for the site in September 2000 because ongoing monitoring had shown that cleanup actions and exposure controls had significantly reduced threats to human health and the environment (EPA 2000). However, the DEQ is overseeing an investigation at the Gould site associated with organic contamination in groundwater. In addition, long-term groundwater monitoring is currently conducted at the Gould site as part of the remedial action requirements for the Soils Operable Unit and operation and maintenance for the OCF (EPA 2002).

Plume Extent

The lateral extent of the lead plume was estimated during the RI. Recent groundwater monitoring data indicate that concentrations of lead have decreased (current maximum concentration of 2.7 µg/L) since soil remediation activities were conducted at the site (DEQ 2004). No available documents in the DEQ file include an estimate of the current extent of the lead plume at the site.

Min/Max Detections

Historic groundwater analytical data presented below were obtained from DEQ (2004).

Analyte	Minimum Concentration (µg/L)	Maximum Concentration (µg/L)
Metals (total)		
Arsenic	NA	610
Chromium	NA	17
Lead	NA	290
Zinc	NA	6,900
Nickel	NA	7.3

NA: not available

In addition to the contaminant concentrations listed above, the lowest pH level measured in groundwater at the site is 5.7, and is likely related to releases of sulfuric acid (DEQ 2004).

Current Plume Data

Lead was not detected in any of the groundwater samples collected during the ACG's most recent groundwater monitoring event with the exception of monitoring well ASW-6 which had a concentration of 2.7 µg/L (EPA 2002).

Preferential Pathways

Utility lines located parallel to NW Front Street [see Supplemental Figure 1.3-2 from Dames & Moore (1987b)] are buried at approximately 20 feet bgs, which is below the water table in the fill unit. The utility line trench backfill may present a zone of higher permeability relative to the surrounding fill and thus be a preferential pathway for groundwater flow (Dames & Moore 1987b).

Downgradient Plume Monitoring Points (min/max detections)

For the past five years, most of the groundwater samples collected from monitoring wells located downgradient from the site have had low concentrations of lead (EPA 2002). Maximum concentrations of lead over this time period for all monitoring wells, except well ASW-6, which had a total lead concentration of 2.7µg/L, have not exceeded 15 µg/L, which is the current drinking water system action level for lead established by the Safe Drinking Water Act (SDWA) (EPA 2002). Well ASW-6 is located on Metro property. The SDWA action level was the standard that was utilized as a basis for EPA's no-action ROD for groundwater (EPA 2000, 2002).

Visual Seep Sample Data

☐ Yes ☒ No

Not applicable.

Nearshore Porewater Data

Not applicable.

Groundwater Plume Temporal Trend

Contaminant levels in groundwater associated with the Gould site have decreased in the 1990s, which may have been a result of remedial activities that eliminated significant source material (EPA 2002).

10.2.4. Summary

Extensive groundwater monitoring data have been collected at the site since the late 1980s. Contaminant levels in groundwater have decreased significantly (EPA 2002). The EPA issued a no-action ROD for groundwater for the site in September 2000 (EPA 2000). However, continued groundwater monitoring under the direction of DEQ is being performed at the site in relation to the Soils Operable Unit and the OCF. The maximum concentration of lead detected in recent groundwater samples collected at the site is 2.7 µg/L (EPA 2002).

10.3. Surface Water

10.3.1. Surface Water Investigation ☒ Yes ☐ No

Surface water samples from East and West Doane lakes and the Willamette River upstream and downstream of the EDL outfall were analyzed for total lead and dissolved metals during the RI (Dames & Moore 1987b). The analytical results are listed in Table 4.5-9 from Dames & Moore (1987b), and are summarized below:

Analyte	West Doane Lake (mg/L)		East Doane Lake (mg/L)		Willamette River Upstream (mg/L)		Willamette River Downstream (mg/L)	
	Min	Max	Min	Max	Min	Max	Min	Max
pH	7.7	NA	6.3	6.4	7.4		8.1	
Lead	0.01 U	0.05	0.01 U	0.28	0.01 U	0.01 U	0.01 U	0.01 U
Arsenic	0.005 U	0.021	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Cadmium	0.002 U	0.002	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
Chromium	0.005 U	0.005 U	0.005 U	0.005	0.005 U	0.005 U	0.005 U	0.005 U
Zinc	0.013	0.043	0.011	0.040	0.008	0.016	0.007	0.051
Iron	0.02 B	0.40 J	0.01 U	0.18 B	0.08 B	0.60	0.05 B	0.26 B
Sulfate	67	95	180	390	4	5	4	5
TOC	12.00	12.00	2.60	4.50	NA	20.00	3.10	20.00
Chlorine	64	180	7	84	12	14	11	14
Nitrate	0.05 U	0.80	1.00	2.20	0.21	0.63	0.21	0.62
Phosphate	0.030	1.600	0.005 U	0.021	0.040	0.120	0.041	0.100
Calcium	14.0	23.0	84.0	150.0	6.3	8.0	5.7	8.0
Potassium	7.50	12.00	2.40	4.80	0.80	1.20	0.60	1.20
Magnesium	5.60	6.50	5.90	12.00	2.30	2.30	2.30	2.70
Sodium	100	280	25	65	11	14	9	13
Alkalinity	140	290 B	28	50	25	30	24	31
Hardness	58	84	240	430	26	30	26	30

Notes:
*Metals results presented for dissolved fraction. All results except pH are in mg/L.
B: concentration in the blank was within 10x the sample result.
U: not detected at or above the detection limit shown.

In September 1998, during the Early Remedial Action (ERA) at the site, surface water samples were collected from three locations at EDL:

- The discharge point of effluent from the dredged sediment dewatering system to EDL
- Northwestern EDL where dredging was considered complete ("Clean Area")
- Central EDL where dredging was underway.

The samples were collected to characterize EDL water quality for the contingency of an EDL overflow and to evaluate the effectiveness of dredging and sediment dewatering in removing contaminants from the EDL water and sediment (Environ 1999). The samples were analyzed for metals, diesel-range TPH, pesticides, VOCs, PCBs, herbicides, SVOCs, and dioxins/furans. Detected analytes included total and dissolved arsenic, cadmium, and lead, total chromium and zinc, diesel-range hydrocarbons, dioxins and furans, pesticides, and 1,2-dichlorobenzene. No mention of an EDL-overflow incident occurring was found in the site files.

10.3.2. General or Individual Stormwater Permit (Current or Past) ☐ Yes ☒ No

Do other non-stormwater wastes discharge to the system? ☐ Yes ☐ No

See Section 10.3.5

10.3.3. Stormwater Data ☐ Yes ☒ No

10.3.4. Catch Basin Solids Data ☐ Yes ☒ No

10.3.5. Wastewater Permit ☐ Yes ☒ No

No information has been found regarding whether the Gould facility operated under a wastewater permit when it was active. During remedial activities, Canonie Environmental Services was permitted by DEQ (NPDES waste discharge permit number 101085) to discharge treated wastewater to the Willamette River via storm drain outfall 001, but only during periods of stormwater discharge in the storm drain. Outfall 001 was identified in the permit as "the point of discharge from the Gould Site to the storm drain that is tributary to the Willamette River" (DEQ 1993). The permit was issued on May 11, 1993 and had an expiration date of March 31, 1998 (DEQ 1993).

In 1999, DEQ modified the NPDES Waste Discharge Permit of the Rhone-Poulenc wastewater collection and treatment system to accept water generated by the filling of East Doane Lake and a large excavation pit at the Gould site, as well as leachate generated by the OCF (DEQ 1999). Two internal compliance monitoring points were added, one at "Outfall 002," which consisted of overflow from EDL and EX-1 discharged to the Rhone-Poulenc treatment facility, and the other at "Outfall 003," consisting of effluent and leachate from the Gould OCF discharged to the facility (DEQ 1999). The Rhone-Poulenc wastewater system discharged to the Willamette River through "Outfall 001" at RM 7 (DEQ 1999).

The table below lists details regarding these two wastewater permits.

Permit Type	Permit No.	Start Date	Outfalls	Volumes	Parameters/Frequency
NPDES Wastewater (Canonie)	101085	5/11/93	#001	Not in excess of 7,000 gallons per day	Hexavalent chromium, copper, lead, mercury, nickel, silver, zinc, TSS, pH, oil and grease/weekly; Bioassay/bimonthly; total flow/Daily
NPDES Wastewater (Rhone-Poulenc)	101180	9/20/99	#001	Unknown	Volume, TSS, chlorinated phenols and phenol, pH, temperature, bromoxynil phenol, bromoxynil octanoate/Each run. TOC, arsenic, lead/Monthly. Chromium, mercury, methylene chloride, trichloroethene, 1,1,1-trichloroethane, 1,4-dichlorobenzene, furans, bioassay/Quarterly

10.3.6. Wastewater Data ☒ Yes ☐ No

Data from effluent monitoring during remedial activities are not currently available.

10.3.7. Summary

Data are inconclusive to determine if surface water is affecting water quality in the Willamette River.

10.4. Sediment

10.4.1. River Sediment Data ☒ Yes ☐ No

Sediment samples were collected from the Willamette River upstream and downstream of the EDL outfall during the RI/FS (Dames & Moore 1987b). These samples generally had low metals concentrations; total lead ranged from 26 to 56 mg/kg, total arsenic ranged from 5.7 to 6.2 mg/kg, total chromium ranged from 9 to 26 mg/kg, and total zinc ranged from 72 to 82 mg/kg. Hexavalent chromium and cadmium concentrations were near or below detection limits.

More recent samples collected in the approximate vicinity of the former EDL outfall include those from the following surveys (Figure 1):

Survey	**Survey Code**	**Year**
McCormick & Baxter RI, Phase I	MBCREOS1	1992
Gasco RI, Phase I	WLCGSA96	1998
City of Portland Outfall Project	WLCOFH02	2004
Rhone-Poulenc 1st Quarter 1995	WLCRPB95	1995
Portland Harbor Sediment Investigation	WR-WSI98	1998

These samples include eight surface samples, plus one subsurface sample collected at SD-12. The results of these nine samples are summarized in Table 2.

10.4.2. Summary

See Final CSM Update.

11. CLEANUP HISTORY AND SOURCE CONTROL MEASURES

11.1. Soil Cleanup/Source Control

The ROD for the soils OU required the excavation of all buried battery casings and matte (smelter waste), the treatment of battery casings to remove and recycle lead, and treatment of contaminated matte, soils, and sediment to reduce lead mobility. The contamination was found to extend onto the Rhone-Poulenc property (ECSI #155, see also Rhone-Poulenc site summary). Former Rhone-Poulenc operations included the formulation, manufacture, and distribution of pesticide products, which resulted in contamination of soil and groundwater on the Rhone-Poulenc and Gould properties by organic compound contaminants (see Section 10.1.1). Remedial investigation and cleanup activities on the Gould and Rhone-Poulenc sites were coordinated by DEQ (EPA 2002).

EPA issued Unilateral Administrative Orders to seven PRP companies in January 1992, requiring the implementation of remedial actions specified in the ROD (EPA 2000). Remedial actions (excavation and treatment) were begun at the site in June 1993. Approximately 24,000 tons of battery casings were excavated and processed through an onsite separation/treatment plant, resulting in 244 tons of plastic and 88 tons of lead recycled. About 20,000 cubic-yard blocks of stabilized material (contaminated soil, matte, and debris) were produced. Several hundred tons of contaminated debris were shipped offsite for disposal. Approximately 15,000 cubic yards of contaminated material were stockpiled onsite (EPA 2000a).

EPA (2002) determined that the separation/treatment process was inefficient and not cost-effective, and that the volume of battery casings to be excavated had been overestimated in the 1988 ROD. Remedial operations were suspended in May 1994, and alternate remedial actions were evaluated. The selected alternative cleanup plan was included in a Proposed ROD

Amendment prepared by EPA and issued for public comment from April 1 to May 31, 1996. The amended ROD was issued on June 3, 1997 (EPA 1997). The ROD amendment called for the onsite remedy to be implemented in two phases: the 1998 ERA, and the 1999 RA (Woodward-Clyde 1998; EPA 1997). The amendment allowed some subsurface materials above EP Toxicity levels to remain in place (e.g., matte below the water table; EPA 1997) based on the types of materials, depth, location, and updated information on groundwater contamination (EPA 2002). According to EPA (2002), the new soil remedial plan called for:

- Construction of an 8.5-acre OCF with runoff and leachate control
- Excavation of the battery casings remaining at the Gould site
- Excavation of contaminated sediment in EDL contaminated above RCRA characteristic hazardous waste levels
- Stabilization of stockpiled lead fines (resulting from the battery treatment plant; EPA 1997)
- Consolidation of approximately 60,000 cubic yards of excavated and previously stockpiled material in the OCF
- Filling of EDL
- Wetlands mitigation measures
- Institutional controls
- Groundwater monitoring (DEQ 2004).

11.2. Groundwater Cleanup/Source Control

Available documents in DEQ files indicate that no groundwater source controls have been conducted at the site.

11.3. Other

A Unilateral Order was issued to the PRPs in July 1997 requiring an early remedial action for the EDL portion of the remedy, which was conducted from June to October 1998 (DEQ 2004). Approximately 8,000 cubic yards of contaminated sediment were excavated from the lake and stockpiled for subsequent disposal in the OCF (DEQ 2004). The 1988 ROD for the soils OU stipulated that the outlet from EDL to the Willamette be blocked so that water exceeding the Oregon water quality standard for lead would not be discharged to the river (EPA 1988).

Construction of the OCF was completed in September 2000. Approximately 77,000 cubic yards of contaminated material was placed into the facility (EPA 2002). As required by the ROD, operations and maintenance of the OCF is ongoing, including monthly inspections and groundwater monitoring (EPA 2002).

11.4. Potential for Recontamination from Upland Sources

According to EPA (2002), site sources have been excavated and removed from the site (recycled) or stabilized in the onsite OCF. As stated above, a continuing monitoring program is in place to ensure that the selected remedy remains protective.

12. BIBLIOGRAPHY / INFORMATION SOURCES

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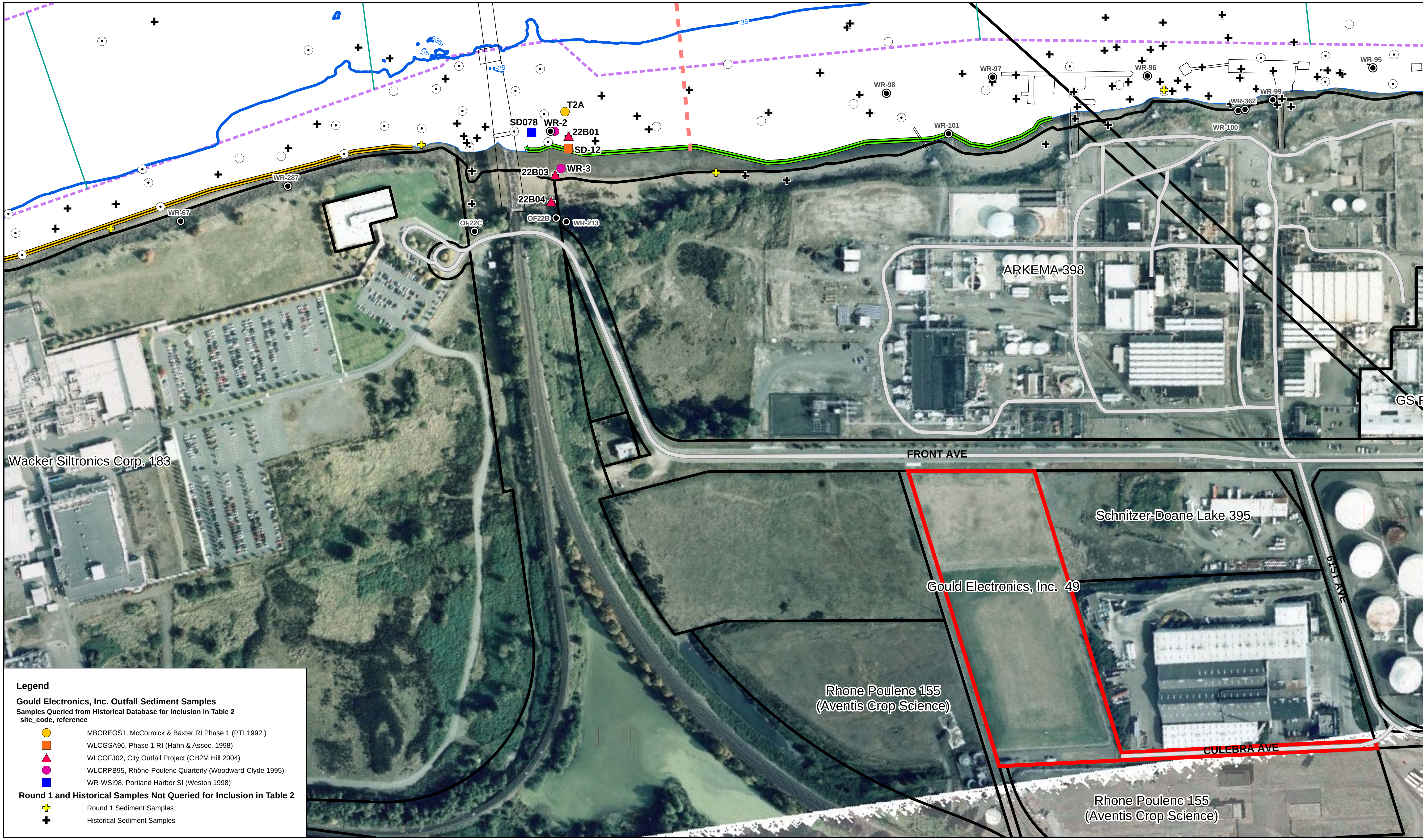
Figures:

Tables:

Supplemental Figures:

Supplemental Tables:

FIGURES



integral consulting inc.

LWG Lower Willamette Group

Map Document: (C:\GIS\Projects\Portland_Harbor\LWG-Map-Projects\Conseptual_Site_Model\Sample_Locations_3rd_Group.mxd)
Plot Date: 08/30/2005

Areal Photo Date: October 2001.
Base Map features from Portland Metro's RLIS.

Outfall information contained on this map is accurate according to available records; however, the City of Portland makes no warranty, expressed or implied, as to the completeness or accuracy of the information published (updated June 2005).

Legend

- Outfalls
- Seep Photo Location (Not location of actual Seep)
- Selected ECSI Site Property Boundary
- Navigation Channel
- Docks & In-water Structures
- River Miles
- -35ft. Contour (NAVD 88)

Human Use Areas

- Dockside Worker
- Recreational Beach Use
- Transient

LWG Round 2 Proposed Sediment Samples

- Surface Sample Only
- Core & Surface Sample

0 125 250 500 Feet

DRAFT

DO NOT QUOTE OR CITE. This document is currently under review by US EPA and its federal, state, and tribal partners, and is subject to change in whole or in part.

Figure 1-Site Features
Portland Harbor RI/FS
Conceptual Site Model
Gould Electronics, Inc.
ECSI 49

TABLES

Gould Electronics, Inc. / NL Industries
Table 1. Potential Sources and Transport Pathways Assessment

Potential Sources	Media Impacted					COIs															Potential Complete Pathway				
						TPH			VOCs																
Description of Potential Source	Surface Soil	Subsurface Soil	Groundwater	Catch Basin Solids	River Sediment	Gasoline-Range	Diesel - Range	Heavier - Range	Petroleum-Related (e.g. BTEX)	VOCs	Chlorinated VOCs	SVOCs	PAHs	Phthalates	Phenolics	Metals	PCBs	Herbicides and Pesticides	Dioxins/Furans	Butyltins	Overland Transport	Groundwater	Direct Discharge - Overwater	Direct Discharge - Storm/Wastewater	Riverbank Erosion
Upland Areas																									
Historical smelter and other site operations	✓	✓	✓		?											✓									
Historical adjacent industires	✓	✓	✓		?										✓			✓							
Historical landfilling operations	✓	✓	✓		?					✓				✓		✓									
Historical contaminated surface soil (secondary source)	✓				?											✓									
Historical contaminated subsurface soil (secondary source)		✓	✓		?					✓					✓	✓		✓	✓						
Historical contaminated E. Doane Lake sediment (secondary source)					?					✓					✓	✓		✓	✓						
Current Onsite Containment Facility			✓							✓					✓	✓		✓	✓						
Overwater Areas																									
Other Areas/Other Issues																									
Former East Doane Lake discharge										✓					✓	✓		✓	✓					✓	

Notes:

[1] All information provided in this table is referenced in the site summaries. If information is not available or inconclusive, a ? may be used, as appropriate. No new information is provided in this table.

✓ = Source, COI are present or current or historic pathway is determined to be complete or potentially complete.

? = There is not enough information to determine if source or COI is present or if pathway is complete.

Blank = Source, COI and historic and current pathways have been investigated and shown to be not present or incomplete.

TPH Total petroleum hydrocarbons
VOCs Volatile organic compounds
SVOCs Semivolatile organic compounds
PAHs Polycyclic aromatic hydrocarbons
BTEX Benzene, toluene, ethylbenzene, and xylenes
PCBs Polychorinated biphenols

Table 2. Queried Sediment Chemistry Data.

Surface or Subsurface	Analyte	Number of Samples	Number Detected	% Detected	Detected Concentrations Minimum	Maximum	Mean	Median	95th	Detected and Nondetected Concentrations Minimum	Maximum	Mean	Median	95th
surface	Polychlorinated biphenyls (ug/kg)	1	0	0						4.7 U	4.7 U	4.7	4.7 U	4.7 U
surface	Total solids (percent)	2	2	100	26.5	65	45.8	26.5	26.5	26.5	65	45.8	26.5	26.5
surface	Total organic carbon (percent)	8	8	100	0.077	4.51	1.3	0.5	2.01	0.077	4.51	1.3	0.5	2.01
surface	Moisture (percent)	2	2	100	51	220	136	51	51	51	220	136	51	51
surface	pH (pH units)	2	2	100	6.4	7	6.7	6.4	6.4	6.4	7	6.7	6.4	6.4
surface	Specific Gravity (Std. Units)	2	2	100	2.49	2.71	2.6	2.49	2.49	2.49	2.71	2.6	2.49	2.49
surface	2,3,7,8-Tetrachlorodibenzo-p-dioxin (pg/g)	2	1	50	3.4	3.4	3.4	3.4	3.4	0.41 U	3.4	1.91	0.41 U	0.41 U
surface	Tetrachlorodibenzo-p-dioxin (pg/g)	2	2	100	11	14	12.5	11	11	11	14	12.5	11	11
surface	1,2,3,7,8-Pentachlorodibenzo-p-dioxin (pg/g)	2	0	0						0.63 U	1.9 U	1.27	0.63 U	0.63 U
surface	Pentachlorodibenzo-p-dioxin (pg/g)	2	0	0						1.3 U	3.6 U	2.45	1.3 U	1.3 U
surface	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (pg/g)	2	0	0						0.58 U	4 U	2.29	0.58 U	0.58 U
surface	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (pg/g)	2	1	50	15	15	15	15	15	2.1 U	15	8.55	2.1 U	2.1 U
surface	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (pg/g)	2	1	50	9.4	9.4	9.4	9.4	9.4	1.1 U	9.4	5.25	1.1 U	1.1 U
surface	Hexachlorodibenzo-p-dioxin (pg/g)	2	2	100	5.2	85	45.1	5.2	5.2	5.2	85	45.1	5.2	5.2
surface	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (pg/g)	2	2	100	34	380	207	34	34	34	380	207	34	34
surface	Heptachlorodibenzo-p-dioxin (pg/g)	2	2	100	88	740	414	88	88	88	740	414	88	88
surface	Octachlorodibenzo-p-dioxin (pg/g)	2	2	100	330	3600	1970	330	330	330	3600	1970	330	330
surface	2,3,7,8-Tetrachlorodibenzofuran (pg/g)	2	2	100	8.5	19	13.8	8.5	8.5	8.5	19	13.8	8.5	8.5
surface	Tetrachlorodibenzofuran (pg/g)	2	2	100	70	91	80.5	70	70	70	91	80.5	70	70
surface	1,2,3,7,8-Pentachlorodibenzofuran (pg/g)	2	2	100	5	86	45.5	5	5	5	86	45.5	5	5
surface	2,3,4,7,8-Pentachlorodibenzofuran (pg/g)	2	1	50	22	22	22	22	22	3.8 U	22	12.9	3.8 U	3.8 U
surface	Pentachlorodibenzofuran (pg/g)	2	2	100	61	180	121	61	61	61	180	121	61	61
surface	1,2,3,4,7,8-Hexachlorodibenzofuran (pg/g)	2	2	100	11	140	75.5	11	11	11	140	75.5	11	11
surface	1,2,3,6,7,8-Hexachlorodibenzofuran (pg/g)	2	1	50	65	65	65	65	65	9.6 U	65	37.3	9.6 U	9.6 U
surface	1,2,3,7,8,9-Hexachlorodibenzofuran (pg/g)	2	0	0						0.41 U	3.5 U	1.96	0.41 U	0.41 U
surface	2,3,4,6,7,8-Hexachlorodibenzofuran (pg/g)	2	1	50	13	13	13	13	13	3.3 U	13	8.15	3.3 U	3.3 U
surface	Hexachlorodibenzofuran (pg/g)	2	2	100	83	260	172	83	83	83	260	172	83	83
surface	1,2,3,4,6,7,8-Heptachlorodibenzofuran (pg/g)	2	1	50	90	90	90	90	90	76 U	90	83	76 U	76 U
surface	1,2,3,4,7,8,9-Heptachlorodibenzofuran (pg/g)	2	2	100	6	33	19.5	6	6	6	33	19.5	6	6
surface	Heptachlorodibenzofuran (pg/g)	2	2	100	150	160	155	150	150	150	160	155	150	150
surface	Octachlorodibenzofuran (pg/g)	2	2	100	120	330	225	120	120	120	330	225	120	120
surface	Gravel (percent)	2	2	100	1.28	4.4	2.84	1.28	1.28	1.28	4.4	2.84	1.28	1.28
surface	Sand (percent)	2	2	100	56.21	79	67.6	56.21	56.21	56.21	79	67.6	56.2	56.21
surface	Fines (percent)	2	2	100	16.5	42.51	29.5	16.5	16.5	16.5	42.51	29.5	16.5	16.5
surface	Silt (percent)	2	2	100	13	39.13	26.1	13	13	13	39.13	26.1	13	13
surface	Clay (percent)	2	2	100	3.38	3.5	3.44	3.38	3.38	3.38	3.5	3.44	3.38	3.38
surface	Dalapon (ug/kg)	6	0	0						1.87 U	1000 U	256	2.41 U	500 U
surface	Dicamba (ug/kg)	6	0	0						1.91 U	100 U	26.5	2.47 U	50 U
surface	MCPA (ug/kg)	6	0	0						3.66 U	50000 U	12500	4.71 U	25000 U
surface	Dichloroprop (ug/kg)	6	0	0						3.08 U	250 U	65	3.97 U	120 U
surface	2,4-D (ug/kg)	6	1	16.7	21	21	21	21	21	3.24 U	250 U	67	4.18 U	120 U
surface	Silvex (ug/kg)	6	0	0						2.8 U	50 U	14.7	3.19 U	25 U
surface	2,4,5-T (ug/kg)	6	0	0						2.8 U	50 U	15.1	3.91 U	25 U
surface	2,4-DB (ug/kg)	6	2	33.3	18.7	23	20.9	18.7	18.7	2.34 U	1000 U	258	18.7	500 U
surface	Dinoseb (ug/kg)	6	0	0						2.68 U	250 U	63.8	3.45 U	120 U
surface	MCPP (ug/kg)	6	0	0						1.63 U	50000 U	12500	2.1 U	25000 U
surface	Aluminum (mg/kg)	5	5	100	5700	25500	17000	21000	23600	5700	25500	17000	21000	23600
surface	Antimony (mg/kg)	4	4	100	0.623 J	32.1	11.2	4.47 J	7.5 J	0.623 J	32.1	11.2	4.47 J	7.5 J
surface	Arsenic (mg/kg)	7	6	85.7	3.3 J	47.5	15.5	5.8 J	22.9	3.3 J	47.5	14.4	8 U	22.9
surface	Cadmium (mg/kg)	7	3	42.9	0.097	1.7	0.859	0.78	0.78	0.00189 U	1.7	0.496	0.3 U	0.78
surface	Chromium (mg/kg)	7	7	100	11.9 J	199	52.9	24.9	74	11.9 J	199	52.9	24.9	74
surface	Copper (mg/kg)	5	5	100	17.2 B	271 B	92.7	34	116 B	17.2 B	271 B	92.7	34	116 B
surface	Lead (mg/kg)	8	8	100	10	266 B	79.6	25	197 B	10	266 B	79.6	25	197 B
surface	Manganese (mg/kg)	2	2	100	487	560	524	487	487	487	560	524	487	487

Table 2. Queried Sediment Chemistry Data.

Surface or Subsurface	Analyte	Number of Samples	Number Detected	% Detected	Detected Concentrations Minimum	Maximum	Mean	Median	95th	Detected and Nondetected Concentrations Minimum	Maximum	Mean	Median	95th
surface	Mercury (mg/kg)	7	6	85.7	0.0207 J	0.625	0.217	0.1	0.36	0.0207 J	0.625	0.201	0.1 U	0.36
surface	Nickel (mg/kg)	5	5	100	16.6 B	138 B	61.1	25	101 B	16.6 B	138 B	61.1	25	101 B
surface	Selenium (mg/kg)	5	2	40	9.42	11	10.2	9.42	9.42	0.102 U	11	4.32	0.712 U	9.42
surface	Silver (mg/kg)	5	4	80	0.136	4.24	1.58	0.932	1	0.136	4.24	1.42	0.932	1
surface	Thallium (mg/kg)	2	1	50	1.2	1.2	1.2	1.2	1.2	1.2	8 U	4.6	1.2	1.2
surface	Zinc (mg/kg)	7	7	100	60.3	689 B	313	190	666 B	60.3	689 B	313	190	666 B
surface	Barium (mg/kg)	2	2	100	149	180	165	149	149	149	180	165	149	149
surface	Beryllium (mg/kg)	2	2	100	0.5	0.79	0.645	0.5	0.5	0.5	0.79	0.645	0.5	0.5
surface	Calcium (mg/kg)	2	2	100	6600	7010 J	6810	6600	6600	6600	7010 J	6810	6600	6600
surface	Chromium hexavalent (mg/kg)	1	1	100	0.17 G	0.17 G	0.17	0.17 G	0.17 G	0.17 G	0.17 G	0.17	0.17 G	0.17 G
surface	Cobalt (mg/kg)	2	2	100	15.4	27	21.2	15.4	15.4	15.4	27	21.2	15.4	15.4
surface	Iron (mg/kg)	2	2	100	40000	41400	40700	40000	40000	40000	41400	40700	40000	40000
surface	Magnesium (mg/kg)	2	2	100	5300	5400	5350	5300	5300	5300	5400	5350	5300	5300
surface	Potassium (mg/kg)	2	2	100	670	930	800	670	670	670	930	800	670	670
surface	Sodium (mg/kg)	2	2	100	530	917	724	530	530	530	917	724	530	530
surface	Vanadium (mg/kg)	2	2	100	89.1	95	92.1	89.1	89.1	89.1	95	92.1	89.1	89.1
surface	2-Methylnaphthalene (ug/kg)	7	5	71.4	4.14	280	68.3	24	24.8	4.14	330 U	143	24.8	330 U
surface	Acenaphthene (ug/kg)	8	5	62.5	6.18	370 J	90.3	17.3	46	6.18	370 J	145	46	330 U
surface	Acenaphthylene (ug/kg)	8	4	50	10.8	250 J	105	17.4	143	10.8	330 U	144	50 U	330 U
surface	Anthracene (ug/kg)	8	5	62.5	13.8	310 J	97.4	60	85.4	13.8	330 U	150	60	330 U
surface	Fluorene (ug/kg)	8	5	62.5	5.74	290 J	72.1	22.6	34	5.74	330 U	134	34	330 U
surface	Naphthalene (ug/kg)	8	5	62.5	10.4	410 J	110	55	60.1	10.4	410 J	157	55	330 U
surface	Phenanthrene (ug/kg)	8	6	75	18.1	930 J	224	60	230	18.1	930 J	250	68	330 U
surface	Low Molecular Weight PAH (ug/kg)	8	6	75	60 A	2560 A	602	94.68 A	425 A	60 A	2560 A	534	330 UA	425 A
surface	Dibenz(a,h)anthracene (ug/kg)	8	5	62.5	21.3	150	73.2	74	91.3	21.3	330 U	135	74	330 U
surface	Benz(a)anthracene (ug/kg)	8	5	62.5	59.2	650 J	240	189	240	50 U	650 J	239	189	330 U
surface	Benzo(a)pyrene (ug/kg)	8	6	75	55	790	292	78.4	404	55	790	302	330 U	404
surface	Benzo(b)fluoranthene (ug/kg)	4	2	50	67	300	184	67	67	67	330 U	257	300	330 U
surface	Benzo(g,h,i)perylene (ug/kg)	8	6	75	61.8	470	219	110	400	61.8	470	247	200	400
surface	Benzo(k)fluoranthene (ug/kg)	4	1	25	310	310	310	310	310	50 U	330 U	255	310	330 U
surface	Chrysene (ug/kg)	8	6	75	53	860 J	294	94.3	340	53	860 J	303	330 U	340
surface	Fluoranthene (ug/kg)	8	6	75	92.7	1300 J	372	130	440	92.7	1300 J	362	176	440
surface	Indeno(1,2,3-cd)pyrene (ug/kg)	8	6	75	46.4	340	155	55	248	46.4	340	199	190	330 U
surface	Pyrene (ug/kg)	8	6	75	113	1400 J	462	190	580	113	1400 J	429	330 U	580
surface	Benzo(b+k)fluoranthene (ug/kg)	8	6	75	67 A	910	376	116	610 A	67 A	910	364	330 UA	610 A
surface	High Molecular Weight PAH (ug/kg)	8	6	75	657.9 A	6800 A	2420	710.7 A	3034 A	330 UA	6800 A	1900	660 A	3034 A
surface	Polycyclic Aromatic Hydrocarbons (ug/kg)	8	6	75	720 A	9360 A	3020	786.02 A	3459 A	330 UA	9360 A	2350	753 A	3459 A
surface	Anthanthrene (ug/kg)	1	0	0						79 U	79 U	79	79 U	79 U
surface	Benzo(e)pyrene (ug/kg)	1	1	100	530	530	530	530	530	530	530	530	530	530
surface	7,12-Dimethylbenz(a)anthracene (ug/kg)	2	0	0						330 U	330 U	330	330 U	330 U
surface	1-Chloronaphthalene (ug/kg)	2	0	0						330 U	330 U	330	330 U	330 U
surface	2-Naphthylamine (ug/kg)	2	0	0						330 U	330 U	330	330 U	330 U
surface	2,4'-Dichlorobiphenyl (ug/kg)	3	2	66.7	1.21 P	3.69 P	2.45	1.21 P	1.21 P	0.45 U	3.69 P	1.78	1.21 P	1.21 P
surface	2,2',5-Trichlorobiphenyl (ug/kg)	3	1	33.3	0.61 JP	0.61 JP	0.61	0.61 JP	0.61 JP	0.32 U	0.61 JP	0.457	0.44 U	0.44 U
surface	2,4,4'-Trichlorobiphenyl (ug/kg)	3	2	66.7	0.22 JP	2.65 P	1.44	0.22 JP	0.22 JP	0.22 JP	2.65 P	1.05	0.28 U	0.28 U
surface	2,2',3,5'-Tetrachlorobiphenyl (ug/kg)	3	2	66.7	0.44 P	1.56 P	1	0.44 P	0.44 P	0.25 U	1.56 P	0.75	0.44 P	0.44 P
surface	2,2',5,5'-Tetrachlorobiphenyl (ug/kg)	3	2	66.7	0.41 JP	6.11	3.26	0.41 JP	0.41 JP	0.4 U	6.11	2.31	0.41 JP	0.41 JP
surface	2,3',4,4'-Tetrachlorobiphenyl (ug/kg)	3	3	100	0.72 P	2.88	1.62	1.27 P	1.27 P	0.72 P	2.88	1.62	1.27 P	1.27 P
surface	2,2',4,5,5'-Pentachlorobiphenyl (ug/kg)	3	3	100	0.76	1.12	0.953	0.98	0.98	0.76	1.12	0.953	0.98	0.98
surface	2,3,3',4,4'-Pentachlorobiphenyl (ug/kg)	3	0	0						0.14 U	0.25 U	0.197	0.2 U	0.2 U
surface	2,3',4,4',5-Pentachlorobiphenyl (ug/kg)	3	0	0						0.17 U	0.3 U	0.237	0.24 U	0.24 U
surface	2,2',3,3',4,4'-Hexachlorobiphenyl (ug/kg)	3	2	66.7	0.34 JP	0.53 JP	0.435	0.34 JP	0.34 JP	0.15 U	0.53 JP	0.34	0.34 JP	0.34 JP
surface	2,2',3,4,4',5'-Hexachlorobiphenyl (ug/kg)	3	3	100	0.99 JP	3.2	1.87	1.42 P	1.42 P	0.99 JP	3.2	1.87	1.42 P	1.42 P
surface	2,2',4,4',5,5'-Hexachlorobiphenyl (ug/kg)	3	3	100	2.24	5.41	3.48	2.8	2.8	2.24	5.41	3.48	2.8	2.8

Table 2. Queried Sediment Chemistry Data.

Surface or		Number	Number	%	Detected Concentrations					Detected and Nondetected Concentrations				
Subsurface	Analyte	of Samples	Detected	Detected	Minimum	Maximum	Mean	Median	95th	Minimum	Maximum	Mean	Median	95th
surface	2,2',3,3',4,4',5-Heptachlorobiphenyl (ug/kg)	3	2	66.7	0.68 P	2.31 P	1.5	0.68 P	0.68 P	0.28 U	2.31 P	1.09	0.68 P	0.68 P
surface	2,2',3,4,4',5,5'-Heptachlorobiphenyl (ug/kg)	3	3	100	0.69 J	5.71	2.62	1.45	1.45	0.69 J	5.71	2.62	1.45	1.45
surface	2,2',3,4',5,5',6-Heptachlorobiphenyl (ug/kg)	3	2	66.7	0.58	4.36	2.47	0.58	0.58	0.31 U	4.36	1.75	0.58	0.58
surface	2,4'-DDD (ug/kg)	3	3	100	115	154	129	117	117	115	154	129	117	117
surface	2,4'-DDE (ug/kg)	3	3	100	15.3	22.6	18.6	17.8	17.8	15.3	22.6	18.6	17.8	17.8
surface	2,4'-DDT (ug/kg)	3	3	100	11.5	39.6	28.2	33.5	33.5	11.5	39.6	28.2	33.5	33.5
surface	4,4'-DDD (ug/kg)	7	6	85.7	8.2	315	183	195	250	0.54 U	315	157	195	250
surface	4,4'-DDE (ug/kg)	7	4	57.1	10	67.9	37.4	19.5	52.2	0.54 U	95 U	37.3	19.5	67.9
surface	4,4'-DDT (ug/kg)	7	6	85.7	54.6	990	393	75.4	900 J	16 U	990	339	75.4	900 J
surface	Total of 3 isomers: pp-DDT,-DDD,-DDE (ug/kg)	7	7	100	8.2 A	1230 A	515	380 A	900 A	8.2 A	1230 A	515	380 A	900 A
surface	Aldrin (ug/kg)	7	0	0						0.54 U	48 U	9.79	1.61 U	8 U
surface	alpha-Hexachlorocyclohexane (ug/kg)	7	1	14.3	1.52 J	1.52 J	1.52	1.52 J	1.52 J	0.54 U	48 U	9.71	1.52 J	8 U
surface	beta-Hexachlorocyclohexane (ug/kg)	7	0	0						0.54 U	48 U	9.78	1.58 U	8 U
surface	delta-Hexachlorocyclohexane (ug/kg)	7	1	14.3	5.33	5.33	5.33	5.33	5.33	0.54 U	48 U	10.3	5.33	8 U
surface	gamma-Hexachlorocyclohexane (ug/kg)	7	0	0						0.54 U	48 U	9.72	1.43 U	8 U
surface	cis-Chlordane (ug/kg)	5	1	20	16.4	16.4	16.4	16.4	16.4	0.47 U	48 U	13.5	1.49 U	16.4
surface	trans-Chlordane (ug/kg)	3	3	100	2.13 J	8.87	6.52	8.55	8.55	2.13 J	8.87	6.52	8.55	8.55
surface	Oxychlordane (ug/kg)	3	1	33.3	10.7	10.7	10.7	10.7	10.7	2.5 U	10.7	5.65	3.74 U	3.74 U
surface	cis-Nonachlor (ug/kg)	3	1	33.3	21.1	21.1	21.1	21.1	21.1	2.5 U	21.1	9.11	3.74 U	3.74 U
surface	trans-Nonachlor (ug/kg)	3	0	0						2.5 U	3.74 U	3.07	2.96 U	2.96 U
surface	Dieldrin (ug/kg)	7	1	14.3	2.78 J	2.78 J	2.78	2.78 J	2.78 J	0.54 U	95 U	18.9	2.78 J	16 U
surface	alpha-Endosulfan (ug/kg)	7	0	0						0.54 U	48 U	9.78	1.59 U	8 U
surface	beta-Endosulfan (ug/kg)	7	0	0						0.54 U	95 U	18.7	1.45 U	16 U
surface	Endosulfan sulfate (ug/kg)	7	0	0						0.54 U	95 U	18.7	1.36 U	16 U
surface	Endrin (ug/kg)	7	0	0						0.54 U	95 U	18.7	1.35 U	16 U
surface	Endrin aldehyde (ug/kg)	7	0	0						0.95 U	95 U	15.7	1.53 U	5 U
surface	Endrin ketone (ug/kg)	7	0	0						0.47 U	95 U	18.6	1.05 U	16 U
surface	Heptachlor (ug/kg)	7	0	0						0.54 U	48 U	9.67	1.29 U	8 U
surface	Heptachlor epoxide (ug/kg)	7	2	28.6	8.9	14	11.5	8.9	8.9	0.54 U	48 U	12.6	8 U	14
surface	Methoxychlor (ug/kg)	7	1	14.3	17.3 J	17.3 J	17.3	17.3 J	17.3 J	0.95 U	480 U	95.3	17.3 J	80 U
surface	Toxaphene (ug/kg)	7	0	0						15.7 U	4800 U	743	25 U	160 U
surface	Azinphosmethyl (ug/kg)	2	0	0						50 U	50 U	50	50 U	50 U
surface	Bromoxynil (ug/kg)	2	0	0						120 U	250 U	185	120 U	120 U
surface	gamma-Chlordane (ug/kg)	2	0	0						0.47 U	48 U	24.2	0.47 U	0.47 U
surface	Chlordane (cis & trans) (ug/kg)	5	0	0						3.52 U	80 U	34.6	5.27 U	80 U
surface	Chlorpyrifos (ug/kg)	2	0	0						50 U	50 U	50	50 U	50 U
surface	Coumaphos (ug/kg)	2	0	0						50 U	50 U	50	50 U	50 U
surface	Demeton (ug/kg)	2	0	0						50 U	50 U	50	50 U	50 U
surface	Diazinon (ug/kg)	2	0	0						50 U	50 U	50	50 U	50 U
surface	Dichlorvos (ug/kg)	2	0	0						50 U	50 U	50	50 U	50 U
surface	Disulfoton (ug/kg)	2	1	50	56	56	56	56	56	50 U	56	53	50 U	50 U
surface	Ethoprop (ug/kg)	2	0	0						50 U	50 U	50	50 U	50 U
surface	Fensulfothion (ug/kg)	2	0	0						50 U	50 U	50	50 U	50 U
surface	Fenthion (ug/kg)	2	0	0						50 U	50 U	50	50 U	50 U
surface	Malathion (ug/kg)	2	0	0						50 U	50 U	50	50 U	50 U
surface	Merphos (ug/kg)	2	0	0						50 U	50 U	50	50 U	50 U
surface	Methyl parathion (ug/kg)	2	0	0						50 U	50 U	50	50 U	50 U
surface	Mevinphos (ug/kg)	2	0	0						50 U	50 U	50	50 U	50 U
surface	Naled (ug/kg)	2	0	0						50 U	50 U	50	50 U	50 U
surface	Perthane (ug/kg)	2	0	0						100 U	100 U	100	100 U	100 U
surface	Phorate (ug/kg)	2	0	0						50 U	50 U	50	50 U	50 U
surface	Prothiophos (ug/kg)	2	0	0						50 U	50 U	50	50 U	50 U
surface	Ronnel (ug/kg)	2	0	0						50 U	50 U	50	50 U	50 U
surface	Stirofos (ug/kg)	2	0	0						50 U	50 U	50	50 U	50 U

Table 2. Queried Sediment Chemistry Data.

Surface or Subsurface	Analyte	Number of Samples	Number Detected	% Detected	Detected Concentrations					Detected and Nondetected Concentrations				
					Minimum	Maximum	Mean	Median	95th	Minimum	Maximum	Mean	Median	95th
surface	Sulprofos (ug/kg)	2	0	0						50 U	50 U	50	50 U	50 U
surface	Tetraethyl pyrophosphate (ug/kg)	2	0	0						50 U	50 U	50	50 U	50 U
surface	Trichloronate (ug/kg)	2	0	0						50 U	50 U	50	50 U	50 U
surface	Diesel fuels (mg/kg)	4	3	75	27.2	159	88	77.9	77.9	27.2	159	78.5	50 U	77.9
surface	Lube Oil (mg/kg)	4	3	75	297	482	379	357	357	100 U	482	309	297	357
surface	Natural gasoline (mg/kg)	1	0	0						20 U	20 U	20	20 U	20 U
surface	2,3,4,6-Tetrachlorophenol (ug/kg)	6	0	0						16.9 U	1600 U	557	24.3 U	1600 U
surface	2,4,5-Trichlorophenol (ug/kg)	7	0	0						16.9 U	330 U	139	96 U	330 U
surface	2,4,6-Trichlorophenol (ug/kg)	7	0	0						16.9 U	120 U	58.1	51 U	96 U
surface	2,4-Dichlorophenol (ug/kg)	7	0	0						16.9 U	160 U	52.5	26 U	64 U
surface	2,4-Dimethylphenol (ug/kg)	7	0	0						16.9 U	64 U	28.8	24.3 U	32 U
surface	2,4-Dinitrophenol (ug/kg)	7	0	0						26 U	190 UJ	106	96.1 U	160 UJ
surface	2-Chlorophenol (ug/kg)	7	0	0						16.9 U	79 U	35.5	24.3 U	64 U
surface	2-Methylphenol (ug/kg)	5	0	0						16.9 U	320 U	79.9	19.2 U	24.3 U
surface	2-Nitrophenol (ug/kg)	7	0	0						16.9 U	96 U	46.5	26 U	79 U
surface	4,6-Dinitro-2-methylphenol (ug/kg)	7	0	0						51 U	320 U	140	120 U	190 U
surface	4-Chloro-3-methylphenol (ug/kg)	7	0	0						16.9 U	160 U	49.8	26 U	64 U
surface	4-Methylphenol (ug/kg)	5	2	40	48	570	309	48	48	33.7 U	570	148	48	48.5 U
surface	4-Nitrophenol (ug/kg)	10	0	0						1.86 U	240 U	81.5	84.3 U	121 U
surface	Pentachlorophenol (ug/kg)	10	1	10	9.66 J	9.66 J	9.66	9.66 J	9.66 J	2.39 U	160 UJ	50.4	19.2 U	120 U
surface	Phenol (ug/kg)	7	0	0						16.9 U	160 U	47.1	24.3 U	64 U
surface	2,3,4,5-Tetrachlorophenol (ug/kg)	1	0	0						79 UJ	79 UJ	79	79 UJ	79 UJ
surface	2,3,5,6-Tetrachlorophenol (ug/kg)	3	0	0						16.9 U	24.3 U	20.1	19.2 U	19.2 U
surface	2,4-Dichloro-6-methylphenol (ug/kg)	2	0	0						230 U	570 U	400	230 U	230 U
surface	2,6-Dichlorophenol (ug/kg)	3	0	0						150 U	370 U	227	160 U	160 U
surface	4-Chloro-o-cresol (ug/kg)	2	0	0						92 U	230 U	161	92 U	92 U
surface	4-Chlorophenol (ug/kg)	2	0	0						370 U	910 U	640	370 U	370 U
surface	Cresol (ug/kg)	2	0	0						46 U	110 U	78	46 U	46 U
surface	Dimethyl phthalate (ug/kg)	7	0	0						16 UJ	330 U	108	19.2 U	330 U
surface	Diethyl phthalate (ug/kg)	7	0	0						16 UJ	330 U	108	19.2 U	330 U
surface	Dibutyl phthalate (ug/kg)	7	0	0						16 U	330 U	108	19.2 U	330 U
surface	Butylbenzyl phthalate (ug/kg)	7	0	0						16 U	330 U	108	19.2 U	330 U
surface	Di-n-octyl phthalate (ug/kg)	7	0	0						16 U	330 U	108	19.2 U	330 U
surface	Bis(2-ethylhexyl) phthalate (ug/kg)	7	3	42.9	210	250	237	250	250	16.9 UJ	330 U	202	250	330 U
surface	1,2-Diphenylhydrazine (ug/kg)	2	0	0						1600 U	1600 U	1600	1600 U	1600 U
surface	Bis(2-chloro-1-methylethyl) ether (ug/kg)	3	0	0						19 U	330 U	226	330 U	330 U
surface	2,4-Dinitrotoluene (ug/kg)	7	0	0						16.9 U	330 U	139	96 U	330 U
surface	2,6-Dinitrotoluene (ug/kg)	7	0	0						16.9 U	330 U	128	79 U	330 U
surface	2-Chloronaphthalene (ug/kg)	7	0	0						1.69 U	330 U	100	16 UJ	330 U
surface	2-Nitroaniline (ug/kg)	7	0	0						16.9 U	1600 U	708	96 U	1600 U
surface	3,3'-Dichlorobenzidine (ug/kg)	7	0	0						16.9 U	660 U	257	96 U	660 U
surface	3-Nitroaniline (ug/kg)	7	0	0						16.9 U	1600 U	710	110 U	1600 U
surface	4-Bromophenyl phenyl ether (ug/kg)	7	0	0						16.9 U	330 U	117	24.3 U	330 U
surface	4-Chloroaniline (ug/kg)	7	0	0						16.9 U	330 U	157	57 U	330 U
surface	4-Chlorophenyl phenyl ether (ug/kg)	7	0	0						16.9 U	330 U	110	24.3 U	330 U
surface	4-Nitroaniline (ug/kg)	7	0	0						16.9 U	1600 U	708	96 U	1600 U
surface	Aniline (ug/kg)	5	0	0						16.9 U	330 U	144	24.3 U	330 U
surface	Benzoic acid (ug/kg)	7	0	0						84.3 U	790 U	277	190 U	330 U
surface	Benzyl alcohol (ug/kg)	7	0	0						16.9 U	330 U	128	24.3 U	330 U
surface	Bis(2-chloroethoxy) methane (ug/kg)	7	0	0						16 U	330 U	108	19.2 U	330 U
surface	Bis(2-chloroethyl) ether (ug/kg)	7	0	0						16.9 U	330 U	113	32 U	330 U
surface	Carbazole (ug/kg)	5	2	40	40 J	59	49.5	40 J	40 J	16.9 U	59	31.9	24.3 U	40 J
surface	Dibenzofuran (ug/kg)	7	2	28.6	20	170 J	95	20	20	16.9 U	330 U	130	24.3 U	330 U
surface	Hexachlorobenzene (ug/kg)	8	2	25	2.59 J	5.94	4.27	2.59 J	2.59 J	1.25 U	32 UJ	15.1	16.9 U	24.3 U

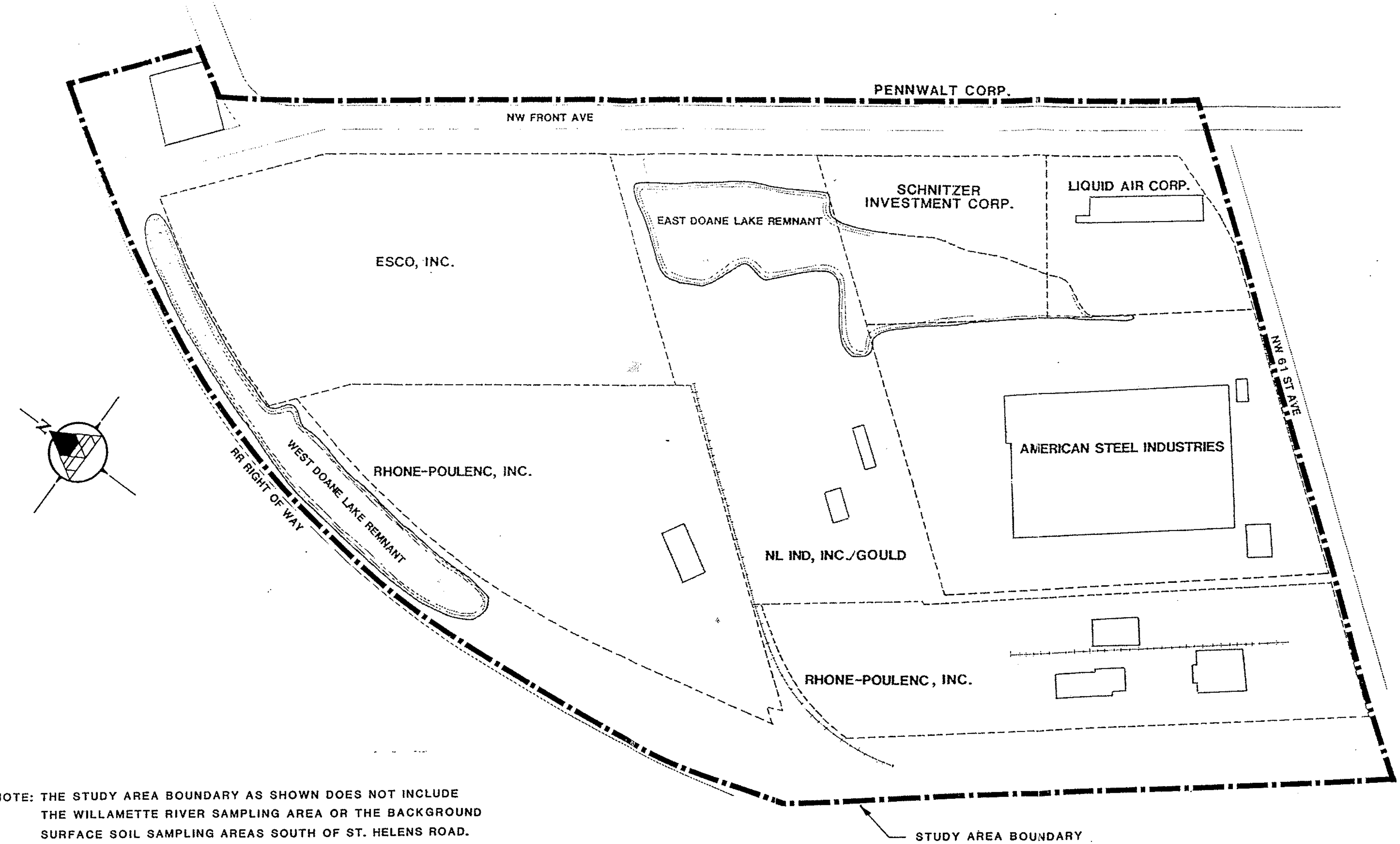
Table 2. Queried Sediment Chemistry Data.

Surface or		Number	Number	%	Detected Concentrations					Detected and Nondetected Concentrations				
Subsurface	Analyte	of Samples	Detected	Detected	Minimum	Maximum	Mean	Median	95th	Minimum	Maximum	Mean	Median	95th
surface	Hexachlorobutadiene (ug/kg)	10	0	0						1.25 U	330 U	82.3	19 U	330 U
surface	Hexachlorocyclopentadiene (ug/kg)	6	0	0						16.9 U	330 U	136	24.3 U	330 U
surface	Hexachloroethane (ug/kg)	10	1	10	2.53 J	2.53 J	2.53	2.53 J	2.53 J	1.25 U	330 U	90.5	19 U	330 U
surface	Isophorone (ug/kg)	7	0	0						16 U	330 U	108	19.2 U	330 U
surface	Nitrobenzene (ug/kg)	7	0	0						16.9 U	330 U	117	24.3 U	330 U
surface	N-Nitrosodimethylamine (ug/kg)	5	0	0						84.3 U	330 U	192	121 U	330 U
surface	N-Nitrosodipropylamine (ug/kg)	7	0	0						16.9 U	330 U	131	38 U	330 U
surface	N-Nitrosodiphenylamine (ug/kg)	7	0	0						16.9 U	330 U	110	24.3 U	330 U
surface	1-Naphthylamine (ug/kg)	2	0	0						330 U	330 U	330	330 U	330 U
surface	2-Methylpyridine (ug/kg)	2	0	0						330 U	330 U	330	330 U	330 U
surface	3-Methylcholanthrene (ug/kg)	2	0	0						330 U	330 U	330	330 U	330 U
surface	4-Aminobiphenyl (ug/kg)	2	0	0						330 U	330 U	330	330 U	330 U
surface	Acetophenone (ug/kg)	2	0	0						330 U	330 U	330	330 U	330 U
surface	alpha,alpha-Dimethylphenethylamine (ug/kg)	2	0	0						330 U	330 U	330	330 U	330 U
surface	Benzidine (ug/kg)	2	0	0						1600 U	1600 U	1600	1600 U	1600 U
surface	Bis(2-chloroisopropyl) ether (ug/kg)	4	0	0						16.9 U	320 UJ	95.1	19.2 U	24.3 U
surface	Diphenylamine (ug/kg)	2	0	0						330 U	330 U	330	330 U	330 U
surface	Ethyl methanesulfonate (ug/kg)	2	0	0						330 U	330 U	330	330 U	330 U
surface	Methyl methanesulfonate (ug/kg)	2	0	0						330 U	330 U	330	330 U	330 U
surface	N-Nitrosodibutylamine (ug/kg)	2	0	0						330 U	330 U	330	330 U	330 U
surface	N-Nitrosopiperidine (ug/kg)	2	0	0						330 U	330 U	330	330 U	330 U
surface	p-Dimethylaminoazobenzene (ug/kg)	2	0	0						330 U	330 U	330	330 U	330 U
surface	Pentachloronitrobenzene (ug/kg)	2	0	0						1600 U	1600 U	1600	1600 U	1600 U
surface	Phenacetin (ug/kg)	2	0	0						330 U	330 U	330	330 U	330 U
surface	Pronamide (ug/kg)	2	0	0						330 U	330 U	330	330 U	330 U
surface	1,1,1-Trichloroethane (ug/kg)	2	0	0						1 U	1 U	1	1 U	1 U
surface	1,1,2,2-Tetrachloroethane (ug/kg)	2	0	0						2 U	2 U	2	2 U	2 U
surface	1,1,2-Trichloroethane (ug/kg)	2	0	0						2 U	2 U	2	2 U	2 U
surface	1,1-Dichloroethane (ug/kg)	2	0	0						1 U	1 U	1	1 U	1 U
surface	Vinylidene chloride (ug/kg)	2	0	0						1 U	1 U	1	1 U	1 U
surface	1,2-Dichloroethane (ug/kg)	2	0	0						2 U	2 U	2	2 U	2 U
surface	1,2-Dichloropropane (ug/kg)	2	0	0						2 U	2 U	2	2 U	2 U
surface	2-Chloroethyl vinyl ether (ug/kg)	2	0	0						10 U	10 U	10	10 U	10 U
surface	Benzene (ug/kg)	3	1	33.3	1.4	1.4	1.4	1.4	1.4	1 U	300 U	101	1.4	1.4
surface	Bromodichloromethane (ug/kg)	2	0	0						2 U	2 U	2	2 U	2 U
surface	Bromoform (ug/kg)	2	0	0						10 U	10 U	10	10 U	10 U
surface	Bromomethane (ug/kg)	2	0	0						10 U	10 U	10	10 U	10 U
surface	Carbon tetrachloride (ug/kg)	2	0	0						1 U	1 U	1	1 U	1 U
surface	Chlorodibromomethane (ug/kg)	2	0	0						2 U	2 U	2	2 U	2 U
surface	Chloroethane (ug/kg)	2	0	0						10 U	10 U	10	10 U	10 U
surface	Chloroform (ug/kg)	2	0	0						1 U	1 U	1	1 U	1 U
surface	Chloromethane (ug/kg)	2	0	0						10 U	10 U	10	10 U	10 U
surface	cis-1,3-Dichloropropene (ug/kg)	2	0	0						4 U	4 U	4	4 U	4 U
surface	Dichlorodifluoromethane (ug/kg)	2	0	0						20 U	20 U	20	20 U	20 U
surface	Ethylbenzene (ug/kg)	3	0	0						1 U	300 U	101	1 U	1 U
surface	Methylene chloride (ug/kg)	2	0	0						10 U	10 U	10	10 U	10 U
surface	Tetrachloroethene (ug/kg)	2	0	0						1 U	1 U	1	1 U	1 U
surface	Toluene (ug/kg)	3	0	0						1 U	300 U	101	1 U	1 U
surface	trans-1,3-Dichloropropene (ug/kg)	2	0	0						2 U	2 U	2	2 U	2 U
surface	Trichloroethene (ug/kg)	2	0	0						1 U	1 U	1	1 U	1 U
surface	Trichlorofluoromethane (ug/kg)	2	0	0						20 U	20 U	20	20 U	20 U
surface	Vinyl chloride (ug/kg)	2	0	0						2 U	2 U	2	2 U	2 U
surface	1,1,2-Trichloro-1,2,2-trifluoroethane (ug/kg)	2	0	0						10 U	10 U	10	10 U	10 U
surface	Ethylene dibromide (ug/kg)	2	0	0						4 U	4 U	4	4 U	4 U

Table 2. Queried Sediment Chemistry Data.

Surface or Subsurface	Analyte	Number of Samples	Number Detected	% Detected	Detected Concentrations Minimum	Maximum	Mean	Median	95th	Detected and Nondetected Concentrations Minimum	Maximum	Mean	Median	95th
surface	1,2-Dichloroethene (ug/kg)	2	0	0						1 U	1 U	1	1 U	1 U
surface	Xylene (ug/kg)	3	0	0						2 U	300 U	101	2 U	2 U
surface	Chlorobenzene (ug/kg)	2	1	50	4.6	4.6	4.6	4.6	4.6	1 U	4.6	2.8	1 U	1 U
surface	1,2-Dichlorobenzene (ug/kg)	7	3	42.9	4.8	1700 J	576	22	22	2 U	1700 J	256	19.2 U	24.3 U
surface	1,3-Dichlorobenzene (ug/kg)	7	0	0						2 U	32 UJ	16.5	19 U	24.3 U
surface	1,4-Dichlorobenzene (ug/kg)	7	2	28.6	4.8	530	267	4.8	4.8	2 U	530	88	19 U	24.3 U
surface	1,2,4-Trichlorobenzene (ug/kg)	7	0	0						16.9 U	330 U	117	24.3 U	330 U
surface	1,2,4,5-Tetrachlorobenzene (ug/kg)	2	0	0						330 U	330 U	330	330 U	330 U
surface	Pentachlorobenzene (ug/kg)	2	0	0						330 U	330 U	330	330 U	330 U
subsurface	Lead (mg/kg)	1	1	100	6.6	6.6	6.6	6.6	6.6	6.6	6.6	6.6	6.6	6.6
subsurface	Acenaphthene (ug/kg)	1	1	100	55	55	55	55	55	55	55	55	55	55
subsurface	Acenaphthylene (ug/kg)	1	1	100	49	49	49	49	49	49	49	49	49	49
subsurface	Anthracene (ug/kg)	1	1	100	130	130	130	130	130	130	130	130	130	130
subsurface	Fluorene (ug/kg)	1	0	0						50 U	50 U	50	50 U	50 U
subsurface	Naphthalene (ug/kg)	1	1	100	58	58	58	58	58	58	58	58	58	58
subsurface	Phenanthrene (ug/kg)	1	1	100	390	390	390	390	390	390	390	390	390	390
subsurface	Low Molecular Weight PAH (ug/kg)	1	1	100	682 A	682 A	682	682 A	682 A	682 A	682 A	682	682 A	682 A
subsurface	Dibenz(a,h)anthracene (ug/kg)	1	1	100	63	63	63	63	63	63	63	63	63	63
subsurface	Benz(a)anthracene (ug/kg)	1	1	100	380	380	380	380	380	380	380	380	380	380
subsurface	Benzo(a)pyrene (ug/kg)	1	1	100	830	830	830	830	830	830	830	830	830	830
subsurface	Benzo(b)fluoranthene (ug/kg)	1	1	100	660	660	660	660	660	660	660	660	660	660
subsurface	Benzo(g,h,i)perylene (ug/kg)	1	1	100	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200
subsurface	Benzo(k)fluoranthene (ug/kg)	1	1	100	220	220	220	220	220	220	220	220	220	220
subsurface	Chrysene (ug/kg)	1	1	100	530	530	530	530	530	530	530	530	530	530
subsurface	Fluoranthene (ug/kg)	1	1	100	1100	1100	1100	1100	1100	1100	1100	1100	1100	1100
subsurface	Indeno(1,2,3-cd)pyrene (ug/kg)	1	1	100	590	590	590	590	590	590	590	590	590	590
subsurface	Pyrene (ug/kg)	1	1	100	2100	2100	2100	2100	2100	2100	2100	2100	2100	2100
subsurface	Benzo(b+k)fluoranthene (ug/kg)	1	1	100	880 A	880 A	880	880 A	880 A	880 A	880 A	880	880 A	880 A
subsurface	High Molecular Weight PAH (ug/kg)	1	1	100	7673 A	7673 A	7670	7673 A	7673 A	7673 A	7673 A	7670	7670 A	7673 A
subsurface	Polycyclic Aromatic Hydrocarbons (ug/kg)	1	1	100	8355 A	8355 A	8360	8355 A	8355 A	8355 A	8355 A	8360	8360 A	8355 A
subsurface	Diesel fuels (mg/kg)	1	0	0						50 U	50 U	50	50 U	50 U
subsurface	Lube Oil (mg/kg)	1	0	0						100 U	100 U	100	100 U	100 U
subsurface	Natural gasoline (mg/kg)	1	0	0						20 U	20 U	20	20 U	20 U
subsurface	Benzene (ug/kg)	1	0	0						300 U	300 U	300	300 U	300 U
subsurface	Ethylbenzene (ug/kg)	1	0	0						300 U	300 U	300	300 U	300 U
subsurface	Toluene (ug/kg)	1	0	0						300 U	300 U	300	300 U	300 U
subsurface	Xylene (ug/kg)	1	0	0						300 U	300 U	300	300 U	300 U

SUPPLEMENTAL FIGURES



NOTE: THE STUDY AREA BOUNDARY AS SHOWN DOES NOT INCLUDE THE WILLAMETTE RIVER SAMPLING AREA OR THE BACKGROUND SURFACE SOIL SAMPLING AREAS SOUTH OF ST. HELENS ROAD.

Reference:
From a topographic survey map dated May 18, 1986, by D.E. Marx & Associates, Gresham, Ore., for Dames & Moore

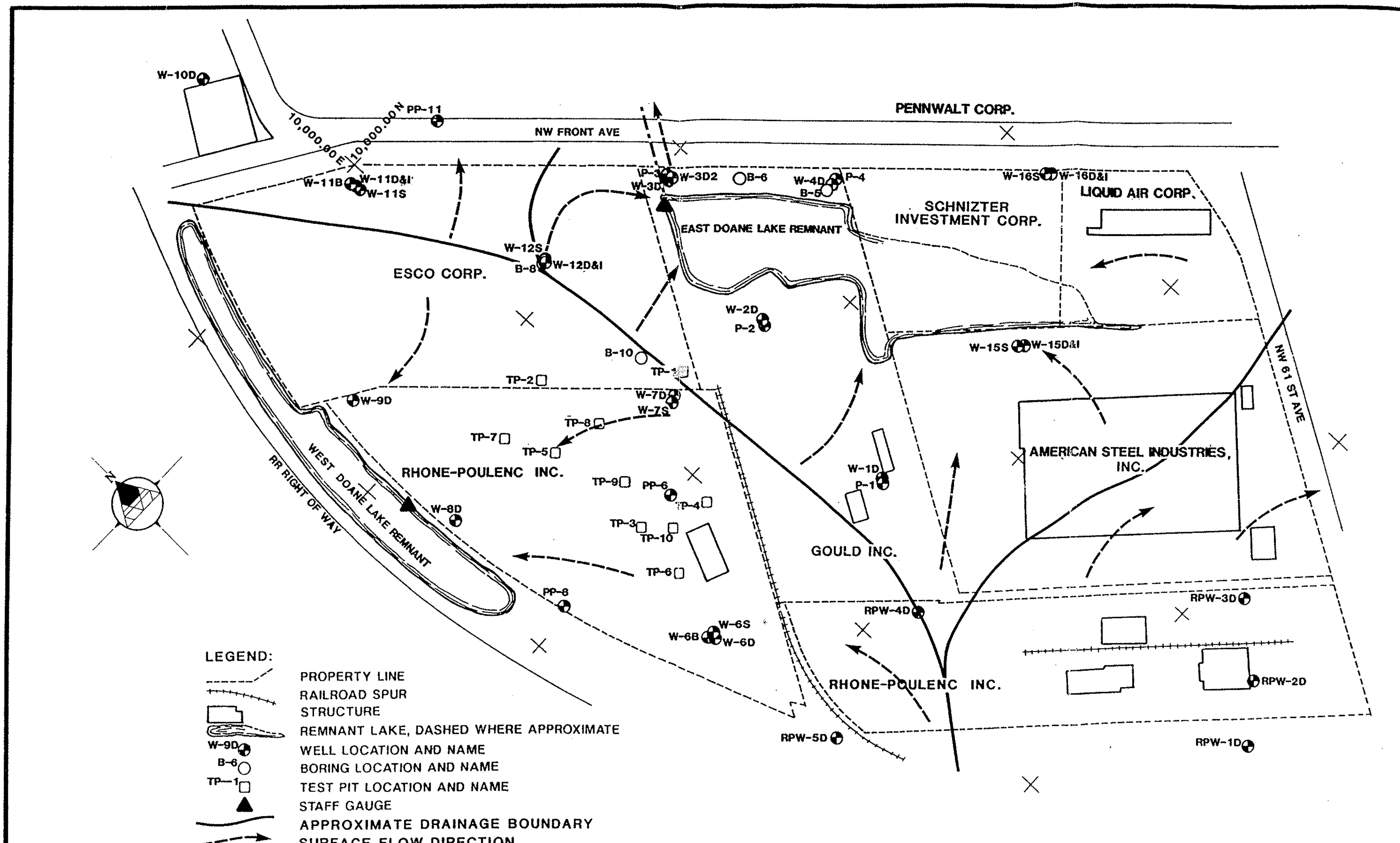
0 100 400 FEET
SCALE 1" 200'

NL IND, INC./GOULD, INC.
REMEDIAL INVESTIGATION

STUDY AREA LOCATION MAP

FIG. 1.3-2 DAMES & MOORE

11831-034



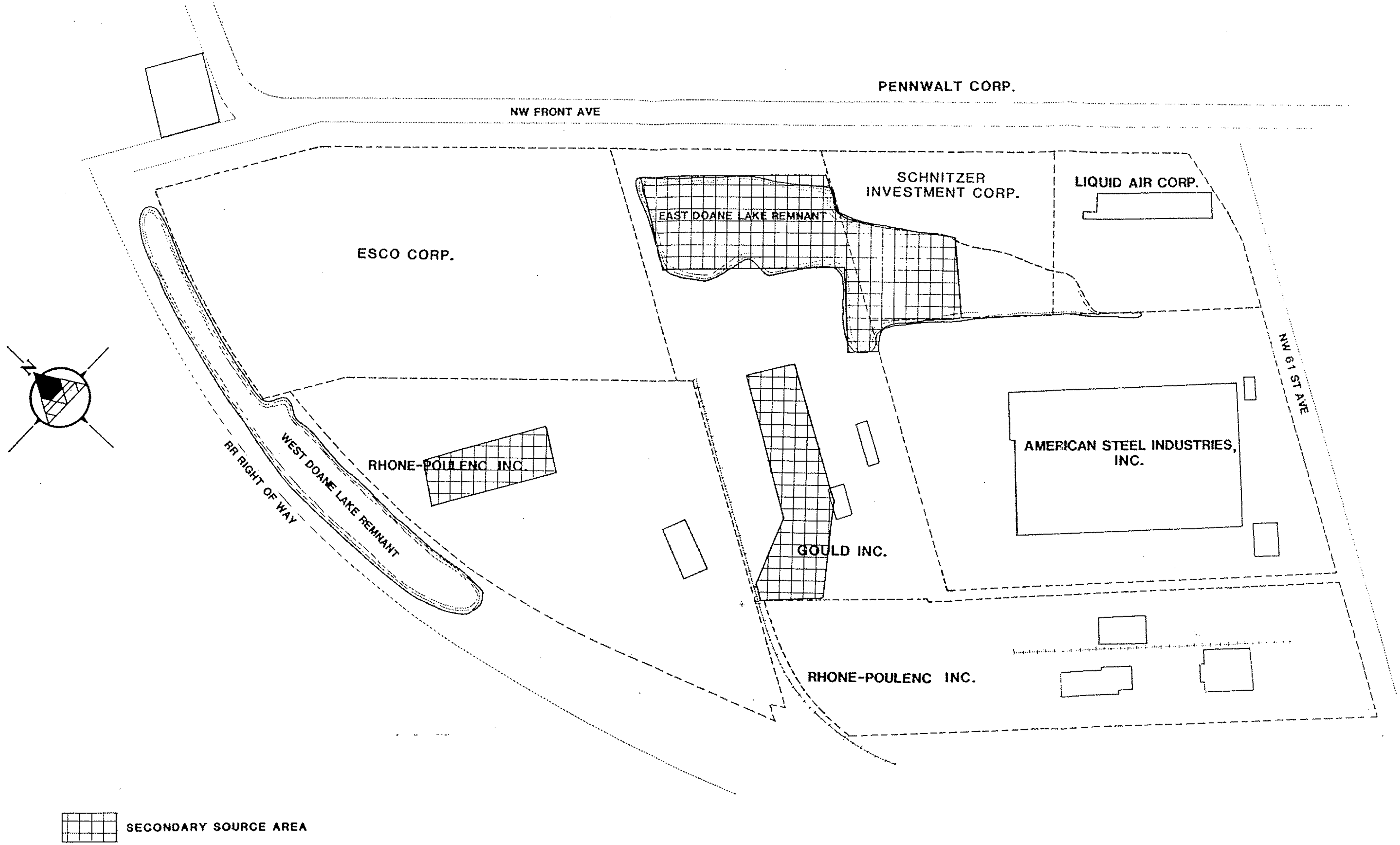
NL IND., INC./GOULD INC.
REMEDIAL INVESTIGATION

SURFACE DRAINAGE BOUNDARIES

FIG. 4.3-1

DAMES & MOORE

11831-034



Reference:
From a topographic survey map dated May 18, 1986,
by D.E. Marx & Associates, Gresham, Ore.,
for Dames & Moore

NL IND., INC./GOULD INC.
REMEDIAL INVESTIGATION

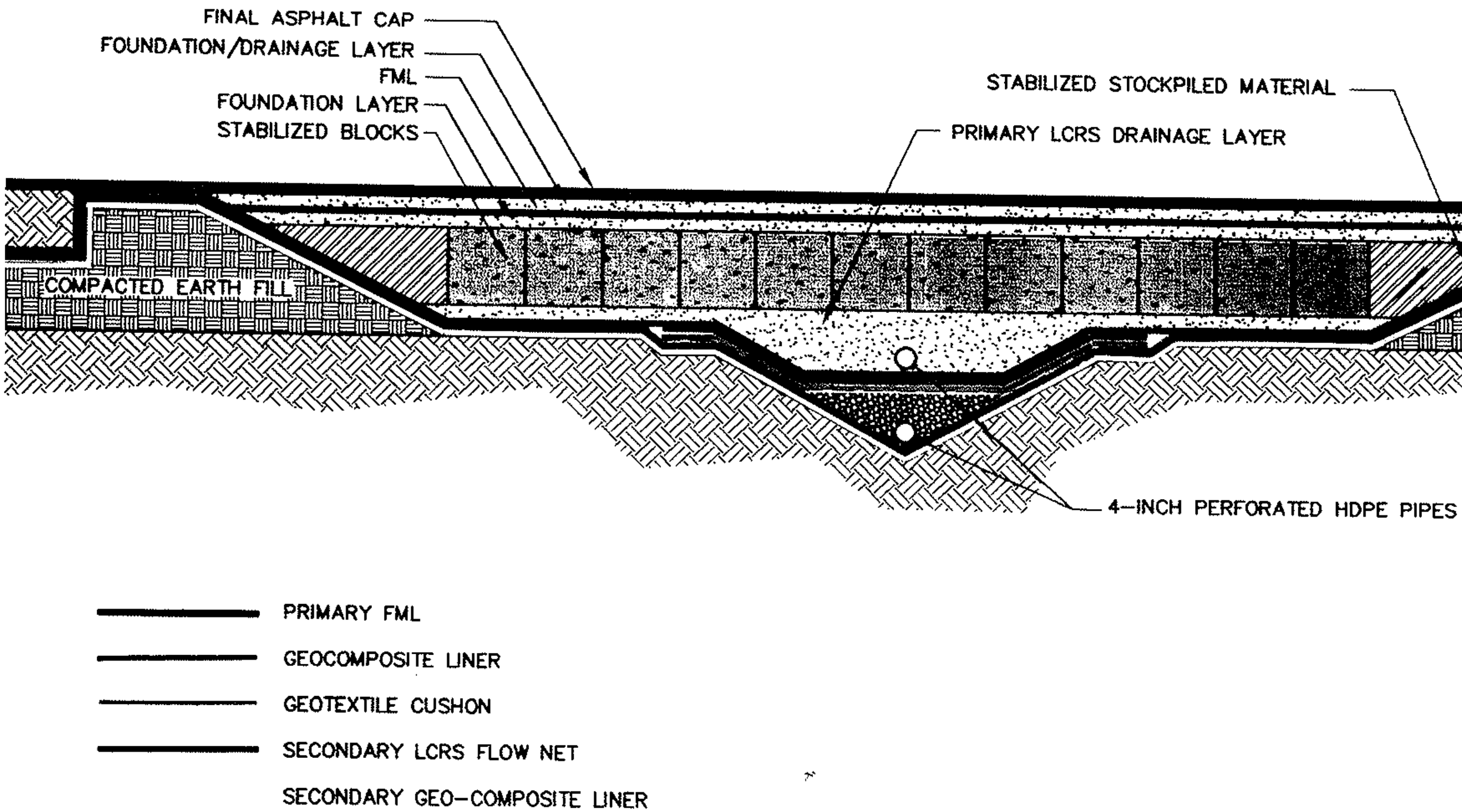
SURFACE SOIL AND SEDIMENT
SECONDARY SOURCE
LOCATION MAP

FIG. 3.2-5 DAMES & MOORE

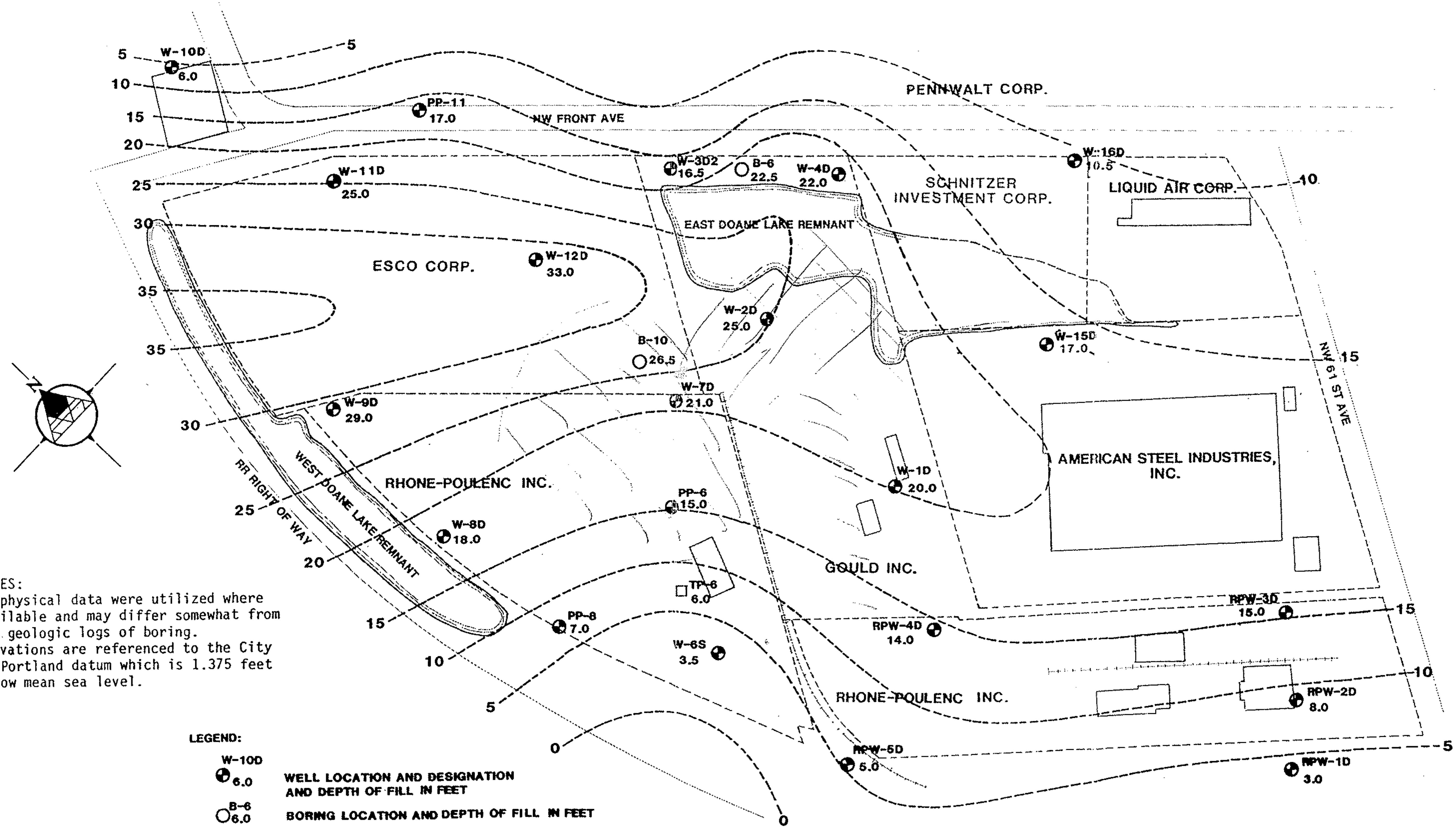
11831-034

GOULD SUPERFUND SITE

CONCEPTUAL ONSITE DISPOSAL FACILITY CROSS SECTION (A-A')



EMCON



NOTES:
Geophysical data were utilized where available and may differ somewhat from the geologic logs of boring.
Elevations are referenced to the City of Portland datum which is 1.375 feet below mean sea level.

LEGEND:

W-10D 6.0 WELL LOCATION AND DESIGNATION AND DEPTH OF FILL IN FEET

B-6 6.0 BORING LOCATION AND DEPTH OF FILL IN FEET

TP-6 6.0 TEST PIT LOCATION AND DEPTH OF FILL IN FEET

CONTOUR INTERVAL = 5 FEET

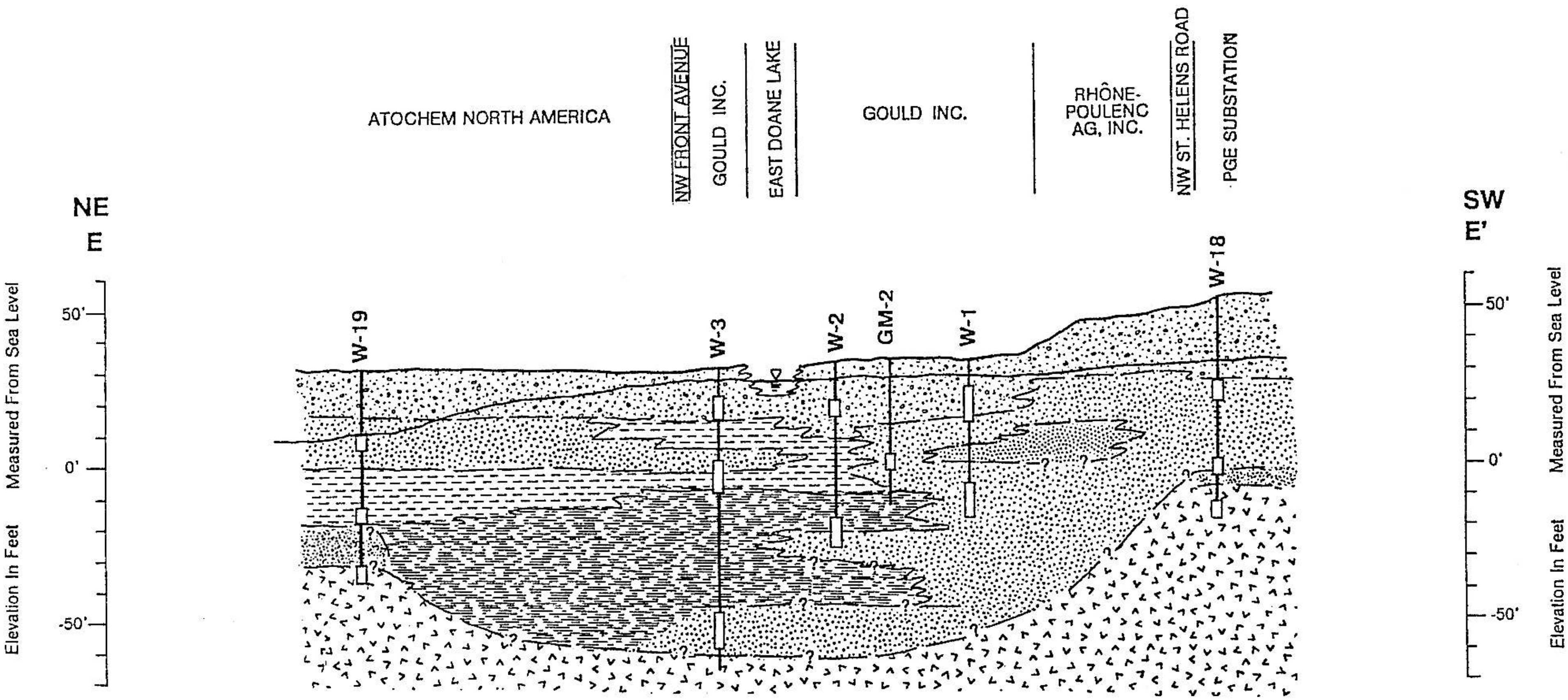
Reference:
From a topographic survey map dated May 18, 1986, by D.E. Marx & Associates, Gresham, Ore., for Dames & Moore

NL IND., INC./GOULD INC.
REMEDIAL INVESTIGATION

FILL THICKNESS MAP

FIG. 4.2-4 DAMES & MOORE

11831-034



LEGEND

Fill

Sand

Silty Sand

Silt

Clayey Silt

Troutdale Formation

Basalt

Water Level July 1990

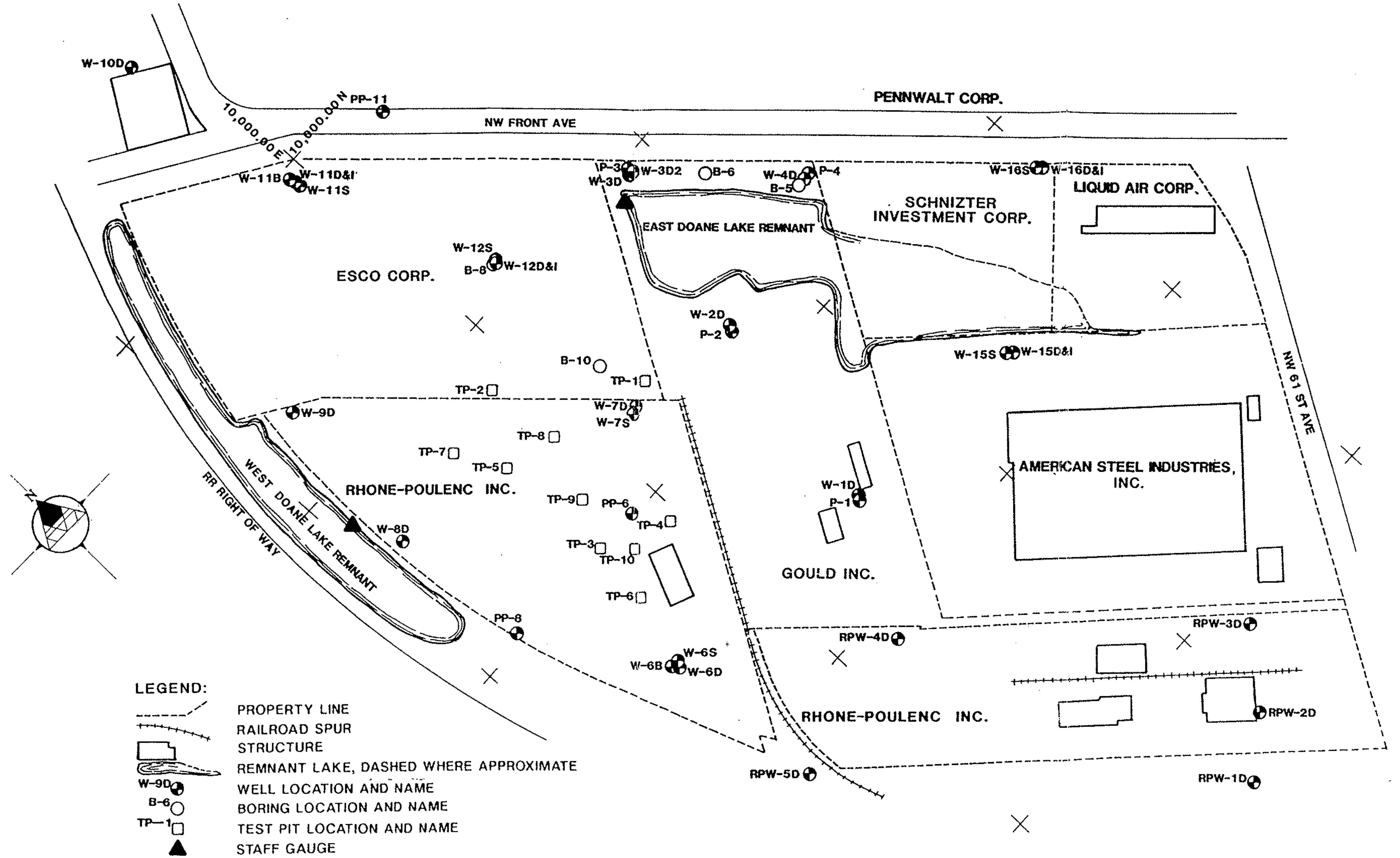
Vertical Scale: 1" = 50'
Horizontal Scale: 1" = 500'

GERAGHTY & MILLER, INC.
Environmental Services

STRATIGRAPHIC CROSS SECTION E-E'

Doane Lake Area
Portland, Oregon

DRAWN BY	COMPILED BY	DATE	PROJECT NUMBER	FIGURE
SAC	AAR	FEB. 1991	WA103.01	3-6



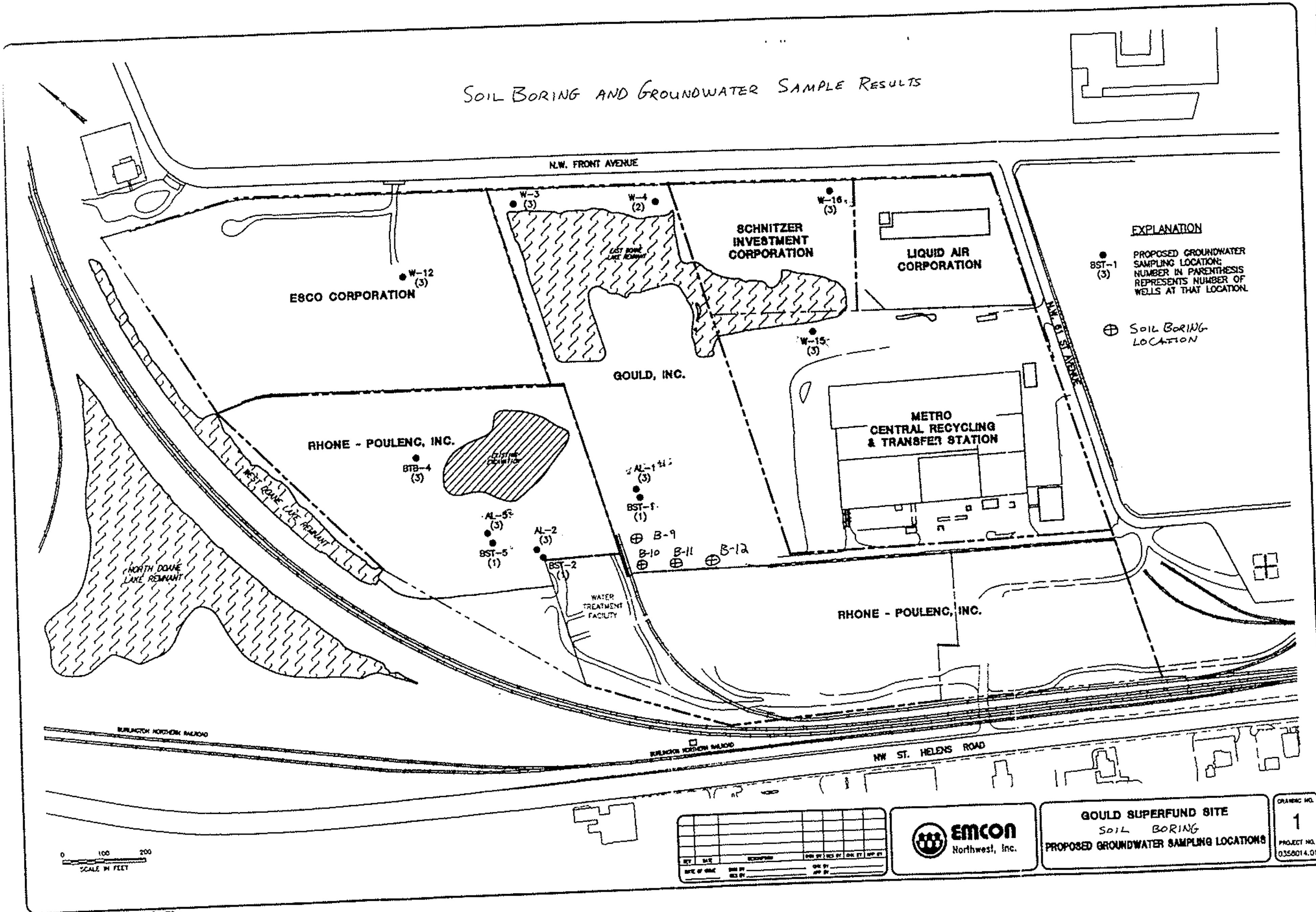
LEGEND:

- PROPERTY LINE
- RAILROAD SPUR
- STRUCTURE
- REMNANT LAKE, DASHED WHERE APPROXIMATE
- W-9D WELL LOCATION AND NAME
- B-6 BORING LOCATION AND NAME
- TP-1 TEST PIT LOCATION AND NAME
- STAFF GAUGE

0 100 400 FEET
SCALE 1" = 200'

NL IND., INC./GOULD INC. REMEDIAL INVESTIGATION
WELL, BORING AND TEST PIT LOCATIONS
FIG. 4.5-1 DAMES & MOORE

11831-034


SOIL BORING AND GROUNDWATER SAMPLE RESULTS
N.W. FRONT AVENUE
ESCO CORPORATION
W-12 (3)
W-3 (3)
W-4 (2)
W-16 (3)
SCHNITZER INVESTMENT CORPORATION
LIQUID AIR CORPORATION
W-15 (3)
GOULD, INC.
METRO CENTRAL RECYCLING & TRANSFER STATION
RHONE - POULENC, INC.
BTB-4 (3)
AL-1 (3)
BST-1 (1)
AL-5 (3)
BST-5 (1)
AL-2 (3)
BST-2 (1)
B-9
B-10
B-11
B-12
WATER TREATMENT FACILITY
WEST DOANE LAKE REMNANT
NORTH DOANE LAKE REMNANT
EAST DOANE LAKE REMNANT
RHONE - POULENC, INC.
N.W. 61 ST AVENUE
BURLINGTON NORTHERN RAILROAD
NW ST. HELENS ROAD
EXPLANATION
BST-1 (3)
PROPOSED GROUNDWATER SAMPLING LOCATION; NUMBER IN PARENTHESIS REPRESENTS NUMBER OF WELLS AT THAT LOCATION.
SOIL BORING LOCATION
0 100 200
SCALE IN FEET
EMCON Northwest, Inc.
GOULD SUPERFUND SITE
SOIL BORING
PROPOSED GROUNDWATER SAMPLING LOCATIONS
DRAWING NO. 1
PROJECT NO. 0356014.01

SUPPLEMENTAL TABLES

TABLE 4: PRELIMINARY SOIL BORING RESULTS
(Data has not been reviewed for QA/QC procedures and results, and therefore is considered preliminary)
Gould Superfund Site Stage I Investigation
Portland Oregon

Sample ID (1)	Detected Test Component (2)	Test Method	Result	Units	Eq(3)	Flags (4)	Dilution Factor
B-9-4.0	Pyritic Sulfur (as S)	ASTM-D2492	0.02	%			1
B-9-4.0	Zinc	EPA 6010	45.4	mg/kg	ppm	B	100
B-9-4.0	Arsenic	EPA 7060	2.6	mg/kg	ppm		1
B-9-4.0	Cadmium	EPA 7131	0.1	mg/kg	ppm		1
B-9-4.0	Chromium	EPA 7191	13.7	mg/kg	ppm	B	10
B-9-4.0	Lead	EPA 7421	3.2	mg/kg	ppm		1
B-9-4.0	Pentachlorophenol	EPA 8040	110	ug/kg	ppb		1
B-9-4.0	TPH-Diesel	TPH-D	1.3	mg/kg	ppm		1
B-10-9.0	Pyritic Sulfur (as S)	ASTM-D2492	0.04	%			1
B-10-9.0	Ammonia	EPA 350.1M	2.2	mg/kg	ppm		1
B-10-9.0	Zinc	EPA 6010	85.1	mg/kg	ppm	B	100
B-10-9.0	Arsenic	EPA 7060	30.4	mg/kg	ppm		10
B-10-9.0	Cadmium	EPA 7131	0.07	mg/kg	ppm		1
B-10-9.0	Chromium	EPA 7191	25.4	mg/kg	ppm	B	20
B-10-9.0	Lead	EPA 7421	100	mg/kg	ppm		50
B-10-9.0	Chlorobenzene	EPA 8010	6	ug/kg	ppb		1
B-10-9.0	1,3-Dichlorobenzene	EPA 8020	4.2	ug/kg	ppb		1
B-10-9.0	1,4-Dichlorobenzene	EPA 8020	21	ug/kg	ppb		1
B-10-9.0	Chlorobenzene	EPA 8020	8.4	ug/kg	ppb		1
B-10-9.0	Pentachlorophenol	EPA 8040	130	ug/kg	ppb		1
B-10-9.0	2,4,5-T	EPA 8150	3900	ug/kg	ppb		1
B-10-9.0	2,4-D	EPA 8150	2000	ug/kg	ppb		1
B-10-9.0	2,3,7,8-TCDD	EPA 8280	0.48	ng/g	ppb		1
B-10-9.0	PeCDFs (total)	EPA 8280	0.58	ng/g	ppb		1
B-10-9.0	TCDDs (total)	EPA 8280	0.88	ng/g	ppb		1
B-10-9.0	TCDFs (total)	EPA 8280	1.6	ng/g	ppb		1
B-10-9.0	TPH-Diesel	TPH-D	5.1	mg/kg	ppm		1
B-11-9.0	Pyritic Sulfur (as S)	ASTM-D2492	0.05	%			1
B-11-9.0	Ammonia	EPA 350.1M	1.5	mg/kg	ppm		1
B-11-9.0	Zinc	EPA 6010	83.6	mg/kg	ppm	B	100
B-11-9.0	Arsenic	EPA 7060	45.7	mg/kg	ppm		10
B-11-9.0	Cadmium	EPA 7131	0.082	mg/kg	ppm		1
B-11-9.0	Chromium	EPA 7191	27.3	mg/kg	ppm	B	20
B-11-9.0	Lead	EPA 7421	19.7	mg/kg	ppm		10
B-11-9.0	Chlorobenzene	EPA 8010	56	ug/kg	ppb		1
B-11-9.0	1,2-Dichlorobenzene	EPA 8020	160	ug/kg	ppb		1
B-11-9.0	1,3-Dichlorobenzene	EPA 8020	10	ug/kg	ppb		1
B-11-9.0	1,4-Dichlorobenzene	EPA 8020	54	ug/kg	ppb		1
B-11-9.0	Chlorobenzene	EPA 8020	23	ug/kg	ppb		1
B-11-9.0	Ethylbenzene	EPA 8020	3.6	ug/kg	ppb		1
B-11-9.0	2,4-Dichlorophenol	EPA 8040	130	ug/kg	ppb		1
B-11-9.0	2,4,5-T	EPA 8150	3	ug/kg	ppb	J	1
B-11-9.0	2,4,5-TP (Silvex)	EPA 8150	11	ug/kg	ppb		1
B-11-9.0	2,4-D	EPA 8150	48	ug/kg	ppb		1
B-11-9.0	2,3,7,8-TCDD	EPA 1613A	21	pg/g	ppt		10
B-11-9.0	TCDDs (total)	EPA 1613A	52	pg/g	ppt		10
B-11-9.0	TCDFs (total)	EPA 1613A	220	pg/g	ppt		10
B-11-9.0	TPH-Diesel	TPH-D	12	mg/kg	ppm		1

Only detected components shown; all other analytes listed in Tables 6 and 7 of the Stage 1 SAP were not detected.

D R A F T 9/15/95

TABLE 4: PRELIMINARY SOIL BORING RESULTS
(Data has not been reviewed for QA/QC procedures and results, and therefore is considered preliminary)
Gould Superfund Site Stage I Investigation
Portland Oregon

Sample ID (1)	Detected Test Component (2)	Test Method	Result	Units	Eq(3)	Flags (4)	Dilution Factor
B-12-5.0	Pyritic Sulfur (as S)	ASTM-D2492	0.04	%			1
B-12-5.0	Ammonia	EPA 350.1M	2.9	mg/kg	ppm		1
B-12-5.0	Zinc	EPA 6010	72.4	mg/kg	ppm	B	100
B-12-5.0	Arsenic	EPA 7060	13.3	mg/kg	ppm		2
B-12-5.0	Cadmium	EPA 7131	0.2	mg/kg	ppm		1
B-12-5.0	Chromium	EPA 7191	24.3	mg/kg	ppm	B	20
B-12-5.0	Lead	EPA 7421	12.4	mg/kg	ppm		5
B-12-5.0	Toluene	EPA 8020	2.5	ug/kg	ppb		1
B-12-5.0	Pentachlorophenol	EPA 8040	120	ug/kg	ppb		1
B-12-5.0 "D"	Pyritic Sulfur (as S)	ASTM-D2492	0.04	%			1
B-12-5.0 "D"	Ammonia	EPA 350.1M	2.9	mg/kg	ppm		1
B-12-5.0 "D"	Zinc	EPA 6010	72.1	mg/kg	ppm	B	100
B-12-5.0 "D"	Arsenic	EPA 7060	12.7	mg/kg	ppm		2
B-12-5.0 "D"	Cadmium	EPA 7131	0.16	mg/kg	ppm		1
B-12-5.0 "D"	Chromium	EPA 7191	24.3	mg/kg	ppm	B	20
B-12-5.0 "D"	Lead	EPA 7421	13.5	mg/kg	ppm		10
B-12-5.0 "D"	Toluene	EPA 8020	1.4	ug/kg	ppb		1
B-12-5.0 "D"	Pentachlorophenol	EPA 8040	130	ug/kg	ppb		1
B-12-5.0 "D"	TPH-Diesel	TPH-D	1.5	mg/kg	ppm		1
Method Blank	OCDD	EPA 1613A	17	pg/g	ppt		1

NOTES:

(1) Sample ID = sample number indicating sample location.
The "B" indicates sample was collected from a soil boring.
The next two digits (e.g., 12) indicate the number of the boring.
The last number indicates the depth of the top of the sample (in ft below ground surface).
"D" indicates sample is a duplicate.

(2) Only detected test components shown as reported via modem by Quanterra Environmental Services.
All soil boring samples were tested for metals and organic compounds by EPA Methods 6010, 7000 series, 8010, 8020, 8080, 8140, 8150, 8240, and 8270 for the analytes as listed in Table 6 and for other components by TPH-D and EPA Methods 350.1 M, 8080, 8015, and 9012M listed in Table 7 of the Stage I SAP (except not tested for Pb by EP Tox).
Note that the analytes for each EPA Method are not necessarily the standard or typical analytes for each method.

Eq(3) = Equivalent concentrations are as noted below:
mg/kg = ppm (parts per million)
ug/kg = ppb (parts per billion)
ng/g = ppb (parts per billion)
pg/g = ppt (parts per trillion)
pg/L = ppq (parts per quadrillion)

Scientific Notation		
10e-3/10e3	=	10e-6
10e-6/10e3	=	10e-9
10e-9/1	=	10e-9
10e-12/1	=	10e-12
10e-12/10e3	=	10e-15

(4) The following data qualification flags are as noted by Quanterra:
B = Analyte also present in laboratory method blank.
J = Approximate concentration.

Only detected components shown; all other analytes listed in Tables 6 and 7 of the Stage 1 SAP were not detected.

TABLE 3: SUMMARY OF EFFLUENT AND EAST DOANE LAKE WATER SAMPLES RESULTS
Gould Superfund Site, Portland, Oregon

Analyte	Sample number / Units	Effluent	"Clean" area	"Clean" Dupl.	Dredge area	Equip. Blank
	Sample number	EDL06	EDL07	EDL09	EDL10	EDL08
	Units	9/10/98	9/10/98	9/10/98	9/11/98	9/10/98
pH (field)		7.16	7.65		7.67	
Turbidity (field)	NTU	2.50	4.64		51.2	
Cond (field)	(mS/cm)	1.99	>199.9		>199.9	
Temp (field)	(C)	25.0	21.7		22.4	
TSS	mg/L	<5 UJ	<5 UJ	<5 UJ	**47 J**	
As (total)	mg/L	**0.127**	**0.018**	**0.018**	**0.0402**	<0.002
As (dissolved)	mg/L	**0.108**	**0.015**	**0.015**	**0.0221**	<0.002
Cd (total)	mg/L	**0.00017**	**0.00038**	**0.00036**	**0.00137**	<0.00005
Cd (dissolved)	mg/L	<0.00005	**0.00025**	**0.00025**	<0.00005	<0.00005
Cr (total)	mg/L	<0.0005	**0.00055**	<0.0005	**0.00544**	<0.0005
Cr (dissolved)	mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Pb (total)	mg/L	**0.305**	**0.498**	**0.489**	**2.42**	<0.002
Pb (dissolved)	mg/L	**0.0025**	**0.254**	**0.257**	**0.0467**	<0.002
Hg (total)	mg/L	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Hg (dissolved)	mg/L	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Zn (total)	mg/L	**0.021**	**0.025**	**0.024**	**0.103**	<0.01
Zn (dissolved)	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
TPH - Diesel	mg/L	**0.38**	**0.31**	**0.31**	**0.41**	<0.25
TPH - Oil	mg/L	<0.5	<0.5	<0.5	<0.5	<0.5
TCDFs (total)	pg/L	**280**	**640**	**520**	**5700**	<0.68
2,3,7,8-TCDF	pg/L	<4.0	<4.3	<2.2	**22**	<0.68
PeCDFs (total)	pg/L	**43**	**180**	**140**	**2000**	<1.6
HpCDFs (total)	pg/L	<3.1	<8.2	<3.9	**54**	<1.0
1,2,3,4,6,7,8-HpCDF	pg/L	<2.2	<8.2	<3.9	**32 J**	<1.0
TCDDS (total)	pg/L	**17**	**850**	**850**	**820**	<1.8
2,3,7,8-TCDD	pg/L	<6.5	**30**	**24**	**140**	<1.0
HpCDDs (total)	pg/L	<3.1	<8.1	<5.4	**110**	<1.8
1,2,3,4,6,7,8-HpCDD	pg/L	<3.1	<8.1	<5.4	**52**	<1.8
OCDD	pg/L	<19	<41	<34	**520**	<6.2
Other F/Dioxins	1613A	ND	ND	ND	ND	ND
4,4'-DDD	ug/L	<0.1	<0.1	<0.1	**0.43**	<0.1
Other OC Pest	8080	ND	ND	ND	ND	ND
OP Pest	8141	ND	ND	ND	ND	ND
2,4-D	ug/L	**3.1**	<0.25	<0.25	**0.28**	<0.25
2,4-DB	ug/L	**1.6**	<1.0	<1.0	<1.0	<1.0
2,4,5-T	ug/L	**1.1**	**0.85**	**0.90**	**0.81**	<0.05
2,4,5-TP (Silvex)	ug/L	**1.2**	**0.78**	**0.79**	**0.74**	<0.05
Other Herb	8150	ND	ND	ND	ND	ND
1,2-DCB	ug/L	**5.2**	<5.0	<5.0	<5.0	<5.0
Chloroform	ug/L	<5.0	<5.0	<5.0	<5.0	**6.3 R**
Other VOCs	8260	ND	ND	ND	ND	ND
SVOCs	8270	ND	ND	ND	ND	ND

Data Qualifier Summary (definitions on Page 2 of table):

J = Approximate.

UJ = Approximate detection limit.

R = Rejected.

TABLE 3: SUMMARY OF EFFLUENT AND EAST DOANE LAKE WATER SAMPLES RESULTS
Gould Superfund Site, Portland, Oregon

Data Qualifier Definitions:

J = The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

UJ = The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

R = The sample results are rejected due to serious deficincies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

Other Notes:

Cond = Electrical Conductivity.
mS/cm = milliSiemens/centimeter.
Temp = Temperature.
C = degrees Centigrade.
mg/L = milligrams per liter (equivalent to parts per million, or ppm).
ug/L = micrograms per liter (equivalent to parts per billion, or ppb).
pg/L = picograms per liter (equivalent to parts per quadrillion, or ppq).
TPH = Total Petroleum Hydrocarbons.
F/Dioxins = Furans and Dioxins by EPA 1613A.
OC Pest = Organochlorine Pesticides by EPA 8080.
OP Pest = Organophosphorus Pesticides by EPA 8141.
Herb = Chlorinated Herbicides by EPA 8150.
1,2-DCB = 1,2-Dichlorobenzene.
VOCs = Volatile Organic Compounds by EPA 8260.
SVOCs = Semivolatile Organic Compounds by EPA 8270.
ND = Not Detected.
Effluent = sample collected from sediment dewatering system discharge pipe (sample # Q/O TG091098EDL06).
"Clean" area = sample collected from mid-depth in Dredge Quad I (dredging was thought to be completed in Dredge Quad I at the time of sample collection) (sample # Q/O WG091098EDL07).
"Clean" Dupl. = a duplicate sample of the "Clean" area sample (sample # Q/O WG091098EDL09).
Dredge area = sample collected from mid-depth in the vicinity of dredge (within 10 feet of dredge) (sample # Q/O WG091198EDL10).
Equip. Blank = Equipment Blank (sample # Q/O WG091098EDL08).

TABLE 4.5-9

SURFACE WATER - ROUND 1 (Aug - Sept, 1986), ROUND 2 (Dec, 1986 - Jan, 1987), AND ROUND 3 (Feb, 1987) ANALYSIS RESULTS

ML Gould: SURFACE WATER - ROUND 1 (Aug - Sept, 1986), ROUND 2 (Dec, 1986 - Jan, 1987), AND ROUND 3 (Feb, 1987) ANALYSIS RESULTS

D & M SAMPLE #	ROUND	LAB#-SAMPLE#	DATE	pH field	pH lab	Tot. Pb mg/L	T.R. Pb mg/L	Dis. Pb mg/L	Dis. As mg/L	Dis. Cd mg/L	Dis. Cr mg/L	Dis. Zn mg/L	Dis. Fe mg/L
WEST DOANE LAKE REMNANTS													
SW-02	1	98374 - 5	08/19/86	7.7	--	--	--	0.05	0.021	0.002	0.005U	0.043	0.40 J
SW-02	3	2538 - 12	02/24/87	--	8.3	0.01	0.01	0.01U	0.005U	0.002U	0.005U	0.017	0.14 B
SW-02-dup	3	2538 - 13	02/24/87	--	8.5	0.02	0.02	0.01U	0.005	0.002U	0.005U	0.013	0.02 B
EAST DOANE LAKE REMNANTS													
SW-01	1	98420 - 1	08/20/86	6.3	6.9	--	--	0.28	0.005U	0.002U	0.005	0.038	0.18 B
SW-01B	2	1298 - 23	12/17/86	--	7.3	0.13	0.06	0.05	--	--	--	--	--
SW-01B	3	2538 - 26	02/24/87	--	7.3	0.14	0.14	0.01U	0.005U	0.002U	0.005U	0.040	0.06 B
SW-01B-dup	3	2538 - 28	02/24/87	--	7.2	0.15	0.15	0.01U	0.005U	0.002U	0.005U	0.035	0.01U
SW-01S	2	1298 - 24	12/17/86	--	7.9	0.15	0.14	0.07	--	--	--	--	--
SW-01S	3	2538 - 25	02/24/87	--	7.4	0.13	0.12	0.01U	0.005U	0.002U	0.005U	0.028	0.15 B
SW-01S-dup	3	2538 - 27	02/24/87	--	7.4	0.13	0.13	0.01U	0.005U	0.002U	0.005U	0.041	0.05 B
SW-01-dup	1	98420 - 2	08/20/86	6.4	7.0	--	--	0.28	0.005U	0.002U	0.005U	0.033	0.17 B
SW-07B	2	1298 - 26	12/17/86	--	8.8	0.12	0.11	0.03	0.005U	0.002U	0.005U	0.015	0.01U
SW-07B	3	2538 - 30	02/24/87	--	8.1	0.11	0.11	0.01U	0.005U	0.002U	0.005U	0.025	0.04
SW-07S	2	1298 - 27	12/17/86	--	8.8	0.14	0.12	0.02	0.005U	0.002U	0.005U	0.024	0.01U
SW-07S	3	2538 - 29	02/24/87	--	8.1	0.11	0.11	0.01U	0.005U	0.002U	0.005U	0.021	0.01U
SW-08B	2	1298 - 28	12/17/86	--	9.0	0.13	0.13	0.03	0.005U	0.002U	0.005U	0.011	0.01U
SW-08S	2	1298 - 29	12/17/86	--	9.0	0.21	0.19	0.02	0.005U	0.002U	0.005U	0.012	0.01U
WILLAMETTE RIVER													
SW-04	1	98424 - 4	08/21/86	7.4	7.0	--	--	0.01U	0.005U	0.002U	0.005U	0.008	0.60
SW-04	3	2538 - 9	02/23/87	--	6.1	0.01U	0.01U	0.01U	0.005U	0.002U	0.005U	0.016	0.08 B
SW-05	1	98424 - 5	08/21/86	8.1	6.8	--	--	0.01U	0.005U	0.002U	0.005U	0.014	0.26 B
SW-05	3	2538 - 8	02/23/87	--	5.9	0.01U	0.01U	0.01U	0.005U	0.002U	0.005U	0.007	0.05 B
SW-05-dup	1	98424 - 6	08/21/86	8.0	6.9	--	--	0.01U	0.005U	0.002U	0.005U	0.011	0.18 B
SW-05-dup	3	2538 - 7	02/23/87	--	5.8	0.01U	0.01U	0.01U	0.005U	0.002U	0.005U	0.051	0.16 B

D & M SAMPLE #	Dis. SO4 mg/L	TOC mg/L	Dis. Cl mg/L	Dis. NO3(N) mg/L	DT PO4(P) mg/L	Dis. Ca mg/L	Dis. K mg/L	Dis. Mg mg/L	Dis. Na mg/L	EC umho/cm	ALK. mg/L	HARD. mg/L
WEST DOANE LAKE REMNANTS												
SW-02	67	--	180	0.05U	1.600	14.0	12.00	5.60	280	870	290 B	58
SW-02	95	12.00	68	0.80	0.039	22.0	7.50	6.50	120	670	140	84
SW-02-dup	90	12.00	64	0.59	0.030	23.0	7.50	6.50	100	660	140	84
EAST DOANE LAKE REMNANTS												
SW-01	390	--	84	2.10	0.008	150.0	4.80	12.00	65	1100	28	430
SW-01B	--	4.30	--	--	--	--	--	--	--	--	--	--
SW-01B	180	3.70	39	1.10	0.005U	84.0	2.40	6.00	25	600	49	250
SW-01B-dup	180	3.20	39	1.10	0.009	86.0	2.40	6.20	26	580	50	240
SW-01S	--	2.60	--	--	--	--	--	--	--	--	--	--
SW-01S	180	4.10	41	1.00	0.005U	86.0	2.40	6.10	25	600	50	250
SW-01S-dup	180	4.30	38	2.20	0.005U	82.0	2.50	6.20	25	600	50	250
SW-01-dup	390	--	82	2.10	0.007	140.0	4.70	11.00	64	1100	30	430
SW-07B	360	3.60	7	1.40	0.005U	100.0	2.70	6.20	36	830	34	320
SW-07B	180	4.50	39	1.70	0.005U	92.0	2.40	6.00	25	560	50	250
SW-07S	310	3.70	58	1.30	0.021	120.0	2.60	6.20	37	830	33	320
SW-07S	180	3.80	38	1.20	0.005U	85.0	2.40	5.90	25	580	50	240
SW-08B	310	3.60	59	1.40	0.005U	120.0	3.00	6.30	37	830	32	320
SW-08S	380	3.70	60	1.40	0.005U	110.0	2.60	6.10	36	860	33	320
WILLAMETTE RIVER												
SW-04	5	--	12	0.21	0.120	6.3	1.20	2.30	14	110	30	28
SW-04	4	20.00	14	0.63	0.040	8.0	0.80	2.30	11	110	25	30
SW-05	5	--	14	0.21	0.100	5.7	1.20	2.70	13	120	31	30
SW-05	4	3.10	11	0.62	0.038	8.0	0.80	2.30	9	100	24	30
SW-05-dup	4	--	12	0.22	0.100	6.0	1.20	2.60	13	110	30	26
SW-05-dup	4	3.50	12	0.61	0.041	8.0	0.60	2.10	9	100	25	28

U: following a number indicates concentration below detection limit. Value shown is detection limit.
dup: following a sample number indicates sample is a duplicate.
B: following a number indicates blank concentration within 10x sample result. See Appendix B Section 4.0 for explanation.
J: following a number indicates estimated concentration. See Appendix B Section 4.0 for explanation.

TABLE 4.5-1

SUMMARY OF CHEMICAL ANALYSES

SUBSURFACE SAMPLES OF FILL

SAMPLE LOCATION	EAST CORD	NORTH CORD	SAMPLE DESIG.	DIST OF SAMP FR. TOP OF ALLUVUIM	GEOLOGIC UNIT	SUMMARY OF LABORATORY RESULTS (1) Ph	Pb	As	Cd	Cr	HEX Cr	Zn	Fe	SO4	CATION EXCH CAP	TOTAL SOLIDS
B-10	10109.8	9256.2	B-10-6	1.0	FILL	10.3	140	15.8	1.10	190	0.5	170	23000	130	7.10	81.5
B-10	10109.8	9256.2	B-10-5	5.7	FILL	10.4	17	2.5	0.70	1200	0.5	10	17000	150	3.60	89.6
B-10	10109.8	9256.2	B-10-4	7.5	FILL	9.4	33	3.5	0.50	1000	0.5	71	64000	25	5.80	91.5
B-10	10109.8	9256.2	B-10-3	11.0	FILL	10.1	60									78.2
B-10	10109.8	9256.2	B-10-2	16.0	FILL	9.8	240	5.8	2.40	770	0.5	210	44000	78	4.80	91.2
B-10	10109.8	9256.2	B-10-1	21.5	FILL	8.0	10	0.9	0.70	7	0.5	6	10000	40	2.20	91.2
B-5	10652.7	9196.8	B-05-4	1.5	FILL	10.0	190									74.2
B-5	10652.7	9196.8	B-05-3	6.5	FILL	11.0	210									79.3
B-5	10652.7	9196.8	B-05-2	11.5	FILL	11.0	98	14.0	0.60	200	1.0	89	28000	100	8.20	83.1
B-5	10652.7	9196.8	B-05-1	15.5	FILL	11.0	110	14.0	0.70	290	1.0	130	31000	160	7.60	82.3
B-5	10652.7	9196.8	B-05-1-dup	15.5	FILL	11.0	120									82.7
B-6	10538.4	9353.7	B-06-4	2.0	FILL	7.7	74									81.6
B-6	10538.4	9353.7	B-06-3	7.8	FILL	7.7	16									75.6
B-6	10538.4	9353.7	B-06-2	12.0	FILL	9.2	75	13.0	0.60	57	1.0	93	26000	140	10.50	82.4
B-6	10538.4	9353.7	B-06-2-dup	12.0	FILL	8.0	56	13.0	0.60	27	1.0	98	26000	160	11.50	81.8
B-6	10538.4	9353.7	B-06-1	17.0	FILL	10.0	42	8.3	0.50	23	1.0	75	25000	220	10.80	80.9
B-8	10116.6	9552.5	B-08-7	0.5	FILL	6.2	41	5.3	0.70	16	1.0	130	26000	180	19.30	65.4
B-8	10116.6	9552.5	B-08-6	2.5	FILL	11.0	30	3.8	0.50	420	1.0	36	27000	150	3.00	86.6
B-8	10116.6	9552.5	B-08-5	7.5	FILL	11.0	87	1.4	0.50	740	1.0	81	61000	190	6.70	87.3
B-8	10116.6	9552.5	B-08-4	12.5	FILL	11.0	98	4.8	0.70	250	1.0	78	26000	46	4.00	87.0
B-8	10116.6	9552.5	B-08-3	17.5	FILL	10.0	21	3.1	0.50	240	1.0	16	85000	28	1.40	86.4
B-8	10116.6	9552.5	B-08-2	22.5	FILL	10.0	96	3.1	0.70	280	1.0	130	34000	48	8.90	90.1
B-8	10116.6	9552.5	B-08-2-dup	22.5	FILL	11.0	140									88.7
B-8	10116.6	9552.5	B-08-1	27.5	FILL	8.4	46	2.3	0.50	41	1.0	38	21000	77	9.70	86.7
W-11D	9967.4	9967.5	W-11D-5	0.0	FILL	7.9	32									70.8
W-11D	9967.4	9967.5	W-11D-4	5.0	FILL	9.5	120	73.0	0.60	200	1.0	92	34000	26	11.40	77.4
W-11D	9967.4	9967.5	W-11D-3	10.0	FILL	12.0	28	3.9	0.50	100	1.0	47	130000	31	11.70	86.0
W-11D	9967.4	9967.5	W-11D-3-dup	10.0	FILL		21	2.7	0.50	260	0.5	54	35000	110	12.00	80.6
W-11D	9967.4	9967.5	W-11D-2	15.0	FILL	11.0	48	2.4	0.50	440	1.0	59	92000	37	7.30	86.8
W-11D	9967.4	9967.5	W-11D-1	20.0	FILL	11.0	17	0.7	0.50	450	1.0	18	29000	27	2.20	89.4
W-15D	10683.3	8656.6	W-15D-2	1.0	FILL	12.7	2300	87.0	13.00	24	0.5	210	6600	50	3.50	55.7
W-15D	10683.3	8656.6	W-15D-4	3.5	FILL	11.9	120		0.50	410		110	44000	12	9.20	82.6
W-15D	10683.3	8656.6	W-15D-4-dup	3.5	FILL	10.9	150									77.1
W-15D	10683.3	8656.6	W-15D-1	5.5	FILL	11.4	290	3.7	1.50	1100	0.5	1000	140000	200		71.8
W-15D.	10683.3	8656.6	W-15D-1-dup	5.5	FILL	11.4										
W-15S	10675.3	8664.5	W-15S-2	1.2	FILL	10.6	340									78.2
W-15S	10675.3	8664.5	W-15S-1	11.5	FILL	8.0	120									83.0
W-16D	11001.7	8863.3	W-16D-3	8.5	FILL	11.1	23	4.3	1.30	19		55	19000	350	10.80	83.8
W-16D	11001.7	8863.3	W-16D-1	5.5	FILL	11.4	110									75.4
W-3D2	10441.9	9472.4	W-3D-3	1.0	FILL	7.0	330		1.90	74		220	31000	6100	26.10	58.2
W-3D2	10441.9	9472.4	W-3D-2	6.0	FILL	9.2	27		0.50	36		64	25000	310	9.20	73.5
W-3D2	10441.9	9472.4	W-3D-2-dup	6.0	FILL	9.4	26									81.0
W-3D2	10441.9	9472.4	W-3D-1	11.0	FILL	8.0	56									83.8
W-7S	10086.9	9141.6	W-7S-4	4.0	FILL	4.5	820									81.7
W-7S	10086.9	9141.6	W-7S-3	5.0	FILL	5.0	620									78.7
W-7S	10086.9	9141.6	W-7S-2	14.0	FILL	6.0	26000									87.3
W-7S	10086.9	9141.6	W-7S-1	19.0	FILL	5.9	67000									89.2
					ALLUVIUM AVERAGE	6.9	20.9	4.7	0.9	23.8	0.8	58.6	24750.0	71.9	12.8	
					ALLUVIUM MAXIMUM	10.9	85.0	6.0	1.6	39.0	1.0	78.0	34000.0	160.0	26.9	
					ALLUVIUM STD DEV	1.6	12.6	1.8	0.4	7.4	0.3	10.6	5471.5	39.5	6.7	
					NUMBER OF SAMPLES	53.0	53.0	5.0	8.0	8.0	2.0	8.0	8.0	8.0	8.0	

NOTES:

1) Value for analyte on left is concentration in mg/kg (ppm).

2) Distance from top of alluvium refers to the distance above or below the fill/alluvium contact.

W3D2 W2D
W3D P2
B6 W1D
W4D P1,2,3,4
B5

TABLE 4.5-2

*SUMMARY OF CHEMICAL ANALYSES
SURFACE SOILS AND BACKGROUND (1)

SAMPLE	EAST COORD	NORTH COORD	GEOLOGIC UNIT	pH	Pb	As	Cd	Cr	Hex Cr	Zn	Fe	SO4	CE Cap	TOTAL SOLIDS
S-01	10167	8472	SURFACE	5	530									93.6
S-01-dup	10167	8472	SURFACE	5.2	480									93.6
S-02	10059	8605	SURFACE	5.2	1700									93.1
S-03	9972	8678	SURFACE	8	3300	19	3.4	15	0.5	10000	27000	43	6.8	94
S-04	10124	8733	SURFACE	8	7900									94.1
S-05	10198	8840	SURFACE	7.3	10000									88
S-06	10218	8720	SURFACE	6.6	1500									93.5
S-07	10234	8808	SURFACE	6.6	1100									93.1
S-09	10258	8941	SURFACE	7.2	20000	63	12	16	0.5	320	34000	500	6.5	93
S-09-dup2	10258	8941	SURFACE		19000	52	11	16	0.5	320	34000	550	6.1	93
S-10R	10653	9197	SURFACE	8.2	130									77.1
S-11R	10538	9354	SURFACE	8.5	27									92.9
S-12	10360	8755	SURFACE	4.7	1500	15	0.6	15	0.5	89	24000	110	4.3	92.4
S-13	10313	8680	SURFACE	5.7	1400									92.4
S-14	10223	8517	SURFACE	5.9	120									91.2
S-20	9790	8740	SURFACE	7.4	260									92.5
S-21	9685	8780	SURFACE	7.5	160	47	0.8	18	0.5	130	33000	14	13	91.6
S-23	9815	8945	SURFACE	7.6	640	7.4	1	16	0.5	170	29000	250	10.6	92
S-24	9642	9064	SURFACE	8.2	750									92.1
S-25	9585	9165	SURFACE	7.6	520									87.5
S-26	9955	8945	SURFACE	8.7	1200	7.1	0.5	15	0.5	180	32000	410	9.2	92.4
S-27	9955	9123	SURFACE	7.4	590	5.5	1.2	10	0.5	300	12000	9600	7.2	90
S-27-dup	9955	9123	SURFACE		990	2.6	1.7	11	0.5	430	14000	9700	7.2	90.4
S-28	9785	9255	SURFACE	9.2	17000									91.7
S-29	9680	9325	SURFACE	7.9	7800									93.3
S-30	9566	9390	SURFACE	8	220									91.2
S-30-dup	9566	9390	SURFACE	8.1	250									91.4
S-31	10110	9256	SURFACE	8.4	68									92.1
S-32	9979	9407	SURFACE	8.2	23	3.8	0.5	170	0.5	55	31000	36	11.2	92
S-33	9846	9555	SURFACE	8.3	22									92.2
S-34	9709	9699	SURFACE	8.2	17									91
S-35	9590	9828	SURFACE	7.4	15	4.8	8.5	18	0.5	51	24000	120	13.8	82.6
S-36	10243	9398	SURFACE	7.8	18									89.4
S-37	10117	9552	SURFACE	8	16									89.7
S-38	9984	9700	SURFACE	8.6	19									89.3
S-39	9853	9845	SURFACE	7.6	19									87.8
S-40	9719	9993	SURFACE	6.9	18									90.4
S-41	10353	9511	SURFACE	7.9	19									91.5
S-42	10227	9664	SURFACE	9.2	21									86.4
S-42-dup	10227	9664	SURFACE	9.3	16									91.2
S-43	10095	9812	SURFACE	8.3	14									89.9
S-44	9955	9960	SURFACE	8.6	18									83.3
S-45	9825	10099	SURFACE	8.4	20									91.6
S-15	11004	8401	SURFACE	8.4	230	7.8	2.5	390		780	31000	34	7.7	85.6
S-16	11112	8507	SURFACE	8.4	120	16	1.8	170		160	37000	21	14	86.7
S-17	10969	8648	SURFACE	8.6	95									88.2
S-17dupe	10969	8648	SURFACE	8.6	100									72.9
S-18	10826	8788	SURFACE	8.4	110									85.3
S-19	10763	8894	SURFACE	7.9	140	6.5	1.5	120		140	39000	20	16.3	87.5
S-22	9580	8900	SURFACE	6.8	66									80.8

SEE NOTES AT END OF TABLE

TABLE 4.5-2

SUMMARY OF CHEMICAL ANALYSES
SURFACE SOILS AND BACKGROUND (1)

SAMPLE	EAST COORD	NORTH COORD	GEOLOGIC UNIT	pH	Pb	As	Cd	Cr	Hex Cr	Zn	Fe	SO4	CE Cap	TOTAL SOLIDS
S-56	(	)	BACKGROUND	7.1	85									77.4
S-57	(refer	)	BACKGROUND	6.3	45									81.6
S-58	(to	)	BACKGROUND	7	44									79.1
S-59	Fig. 4.5-13		BACKGROUND	5.9	34									78.3
S-60	(	)	BACKGROUND	5.6	15									85
		BACKGROUND AVERAGE		6.4	44.6									
		BACKGROUND MAXIMUM		7.1	85.0									
		BACKGROUND STD DEV		0.6	22.9									
		NUMBER SAMPLES		5.0	5.0									
		ALLUVIUM AVERAGE		6.9	20.9	4.7	0.9	23.8	0.8	58.6	24750.0	71.9	12.8	
		ALLUVIUM MAXIMUM		10.9	85.0	6.0	1.6	39.0	1.0	78.0	34000.0	160.0	26.9	
		ALLUVIUM STD DEV		1.6	12.6	1.0	0.4	7.4	0.3	10.6	5471.5	39.5	6.7	
		NUMBER OF SAMPLES		53.0	53.0	5.0	8.0	8.0	2.0	8.0	8.0	8.0	8.0	

NOTES

1) Value for analyte on left is concentration in mg/kg (ppm).
2) Refer to Figure 4.5-2 for surface soil locations.
3) Refer to Figure 4.5-13 for background sample locations.

TABLE 4.5-3
SUMMARY OF CHEMICAL ANALYSES

SUBSURFACE SAMPLES OF ALLUVIUM

SAMPLE LOCATION	EAST CORD	NORTH CORD	SAMPLE DESIG.	DIST OF SAMP FR. TOP OF ALLUVUIM	GEOLOGIC UNIT	SUMMARY OF LABORATORY RESULTS (1) Ph	Pb	As	Cd	Cr	HEX Cr	Zn	Fe	SO4	CATION EXCH CAP	TOTAL SOLIDS
B-10	10109.8	9256.2	B-10-9	-9.5	ALLUVIUM	4.0	15									73.5
B-10	10109.8	9256.2	B-10-8	-4.2	ALLUVIUM	4.5	13									76.3
B-10	10109.8	9256.2	B-10-7	-2.7	ALLUVIUM	8.9	43									80.9
B-5	10652.7	9196.8	B-05-6	-3.5	ALLUVIUM	5.8	16									62.0
B-5	10652.7	9196.8	B-05-5	-1.0	ALLUVIUM	9.6	62									77.6
B-6	10538.4	9353.7	B-6-6	-8.0	ALLUVIUM	5.2	17									67.5
B-6	10538.4	9353.7	B-06-5	-1.0	ALLUVIUM	5.7	29									64.8
B-8	10089.8	9552.6	W-12D-28	-47.0	ALLUVIUM	6.6	10									71.8
B-8	10089.8	9552.6	W-12D-25	-37.0	ALLUVIUM	6.3	15									63.6
B-8	10089.8	9552.6	W-12D-20	-27.0	ALLUVIUM	5.8	15									67.3
B-8	10089.8	9552.6	W-12D-16	-17.0	ALLUVIUM	6.0	14									66.9
B-8	10089.8	9552.6	W-12D-12	-7.0	ALLUVIUM	6.6	15									62.7
B-8	10116.6	9552.5	B-08-8	-1.5	ALLUVIUM	5.7	16	3.3	0.50	15	1.0	64	29000	50	26.90	60.2
W-11D	9967.4	9967.5	W-11D-12	-75.0	ALLUVIUM	7.8	17									71.4
W-11D	9967.4	9967.5	W-11D-11	-65.0	ALLUVIUM	7.2	17									73.5
W-11D	9967.4	9967.5	W-11D-10	-55.0	ALLUVIUM	7.2	15									71.4
W-11D	9967.4	9967.5	W-11D-9	-45.0	ALLUVIUM	7.4	17									75.6
W-11D	9967.4	9967.5	W-11D-8	-35.0	ALLUVIUM	7.9	22									70.4
W-11D	9967.4	9967.5	W-11D-7*	-25.0	ALLUVIUM	6.5	13									72.1
W-11D	9967.4	9967.5	W-11D-7	-10.0	ALLUVIUM	5.8	24									56.4
W-11D	9967.4	9967.5	W-11D-6	-5.0	ALLUVIUM	7.0	28									57.8
W-15D	10683.3	8656.6	W-15D-12	-48.5	ALLUVIUM	8.0	12									73.7
W-15D	10683.3	8656.6	W-15D-11	-38.0	ALLUVIUM	5.6	31									74.8
W-15D	10683.3	8656.6	W-15D-10	-28.0	ALLUVIUM	3.6	36									79.6
W-15D	10683.3	8656.6	W-15D-9	-24.0	ALLUVIUM	4.3	18									82.3
W-15D	10683.3	8656.6	W-15D-8	-18.5	ALLUVIUM	3.6	10									79.8
W-15D	10683.3	8656.6	W-15D-7	-13.0	ALLUVIUM	9.4	26	4.8	0.70	39		53	22000	70	7.70	80.0
W-15D	10683.3	8656.6	W-15D-6	-9.0	ALLUVIUM	9.7	16									75.6
W-15D	10683.3	8656.6	W-15D-5	-2.0	ALLUVIUM	7.8	21	3.9	1.60	28		47	18000	64	7.50	78.1
W-15D	10683.3	8656.6	W-15D-3	-0.6	ALLUVIUM	10.9	17	6.0	0.60	15	0.5	47	23000	92	4.40	77.2
W-16D	11001.7	8863.3	W-16D-24	-69.5	ALLUVIUM	8.0	17									74.5
W-16D	11001.7	8863.3	W-16D-21	-59.5	ALLUVIUM	7.7	18									71.9
W-16D	11001.7	8863.3	W-16D-18	-49.5	ALLUVIUM	6.9	20									70.5
W-16D	11001.7	8863.3	W-16D-15	-39.5	ALLUVIUM	7.4	23									72.5
W-16D	11001.7	8863.3	W-16D-13	-29.5	ALLUVIUM	6.3	11									56.4
W-16D	11001.7	8863.3	W-16D-10	-20.0	ALLUVIUM	5.7	12									61.9
W-16D	11001.7	8863.3	W-16D-9	-14.5	ALLUVIUM	8.2	15									76.5
W-16D	11001.7	8863.3	W-16D-8	-9.5	ALLUVIUM	9.8	16									64.4
W-16D	11001.7	8863.3	W-16D-6	-5.0	ALLUVIUM	9.5	24	5.5	1.60	20		61	22000	160	12.40	78.7
W-3D2	10441.9	9472.4	W-3D-18	-71.2	ALLUVIUM	7.9	28		0.60	23		78	31000	72	10.70	74.2
W-3D2	10441.9	9472.4	W-3D-16	-63.0	ALLUVIUM	7.9	15									67.4
W-3D2	10441.9	9472.4	W-3D-14	-54.0	ALLUVIUM	6.8	16									52.4
W-3D2	10441.9	9472.4	W-3D-12	-44.0	ALLUVIUM	6.8	85									70.0
W-3D2	10441.9	9472.4	W-3D-10	-35.5	ALLUVIUM	7.3	11									66.5
W-3D2	10441.9	9472.4	W-3D-8	-24.0	ALLUVIUM	6.9	10		0.50	28		50	19000	54	18.60	67.3
W-3D2	10441.9	9472.4	W-3D-6	-14.0	ALLUVIUM	5.5	16									60.5
W-3D2	10441.9	9472.4	W-3D-5	-9.2	ALLUVIUM	6.2	16									68.8
W-3D2	10441.9	9472.4	W-3D-4	-4.0	ALLUVIUM	5.7	22									62.7
W-6S	9779.1	8731.9	W-6S-4-dup	-21.5	ALLUVIUM	6.9	18									76.9
W-6S	9779.1	8731.9	W-6S-4	-21.5	ALLUVIUM	6.6	16		0.70	22		69	34000	13	14.40	74.4
W-6S	9779.1	8731.9	W-6S-3	-16.5	ALLUVIUM	7.4	28									74.1
W-6S	9779.1	8731.9	W-6S-2	-11.5	ALLUVIUM	7.1	20									74.8
W-6S	9779.1	8731.9	W-6S-1	-1.5	ALLUVIUM	5.5	29									77.7
					ALLUVIUM AVERAGE	6.9	20.9	4.7	0.9	23.8	0.8	58.6	24750.0	71.9	12.8	
					ALLUVIUM MAXIMUM	10.9	85.0	6.0	1.6	39.0	1.0	78.0	34000.0	160.0	26.9	
					ALLUVIUM STD DEV	1.6	12.6	1.0	0.4	7.4	0.3	10.6	5471.5	39.5	6.7	
					NUMBER OF SAMPLES	53.0	53.0	5.0	8.0	8.0	2.0	8.0	8.0	8.0	8.0	

NOTES:
1) Value for analyte on left is concentration in mg/kg (ppm).
2) Distance from top of alluvium refers to the distance above or below the fill/alluvium contact.